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Technology, Structure, and Workgroup Effectiveness: A Test of a Contingency Model¹

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The effectiveness of workgroups should be affected by decisions on technology and structure. Three dimensions of technology, three of structure, and two measures of workgroup effectiveness were used to test a contingency model. Results revealed little support for hypothesized relationships. Several unanticipated significant main and interactive effects of technology on effectiveness were found.

Research on technology and its impact on structure and effectiveness seems to have generated more controversy than agreement (Daft & MacIntosh, 1981; Fry, 1982; Gerwin, 1981; Withey, Daft, & Cooper, 1983). The literature is replete with studies showing clear relationships between technology and various components of structure, and others showing weak associations between these variables (Mills & Moberg, 1982). As a metaconstruct, technology has been defined as the organizational process of transforming inputs to outputs. Structure, also a metaconstruct, is defined as the pattern of events in social systems. Both of these are broad categories. Within these categories have been numerous conceptualizations and operationalizations that have made it difficult to compare results across studies (Comstock & Scott, 1977).

In Fry's (1982) survey of 37 technology-structure studies, technology was found to have been defined at least five different ways:

1. Technical complexity (Woodward, 1965)
2. Operations technology and operations variability (Hickson, Pugh, & Pheysey, 1969)

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3. Interdependence (Hrebiniak, 1974)
4. Routine-nonroutine (Perrow, 1967, 1970)
5. Manageability of raw materials (Mohr, 1971).

Still another problem is that technology can be distinguished at three different levels: individual, work unit, and the larger organization. It is likely that characteristics of technology at one level may not be reflected in the organization's technology at the next level. Similarly, many different structural factors have been examined, and even when similar variables have been used, they are seldom operationalized to facilitate comparability.

The purpose of this research is to test a contingency prediction of workgroup effectiveness. Understanding how technology and structure impact the effectiveness of a workgroup presents several problems. There is the problem of who should respond, and how to aggregate individual level data to represent workgroup characteristics (James, 1982; Lincoln & Zeitz, 1980; Roberts, Hulin, & Rousseau, 1978; Van de Ven & Ferry, 1980). Even a more salient issue is the type(s) of technological variable(s) that should affect structural properties and effectiveness of a workgroup.

The association between contingency variables and performance has been reviewed by Dewar and Werbel (1979), Dalton, Todór, Spendolini, Fielding, and Porter (1980), and Argote (1982). The problems addressed by these researchers indicate that: (1) many of the studies have not used performance as a variable; (2) the studies do not conclusively indicate that variation in designs have serious consequences for performance and satisfaction levels; and (3) few researchers use similar constructs for structure and technology that permit generalizations across studies.

In this paper the workgroup technology and structure literatures are reviewed, and four specific hypotheses are derived from this literature to test a contingency model of effectiveness.

Review of Workgroup Level Studies

A workgroup is defined as the smallest formal grouping of personnel within an organization. It represents a relatively permanent arrangement of people and equipment. There have been few empirical investigations of structure and technology at the workgroup level. Extensive reviews by Gerwin (1981) and Fry (1982) discovered only 10 studies. To date, only Schoonhoven's (1981) and Argote's (1982) studies have tested contingency theory, measuring performance, at the workgroup level. The other studies provide only indirect tests of a contingency theory because they failed to measure performance directly. However, these studies provide rich conceptual insights concerning the problems confronting the field, and the salient facets of these undertakings are summarized here.

Bell (1967), using task variety to measure technology and supervisor's span of control for structure, found a negative relationship between these variables. As task variety increased, the supervisor's span of control decreased. Grimes and Klein (1973) differentiated between unit and

organizational technology to examine the "technological imperative." Using Perrow's (1967) paradigm, they dichotomized their sample into unit task technology (individual) and modal technology (workgroup level) to investigate how technology is related to the authority structure of management personnel. They found little relationship between technology and structure at the workgroup level. Technology at both levels was highly related to the authority structure when decisions had to do with the task itself.

Hrebiniak (1974), using three measures of technology—task predictability, task interdependence, and task manageability—and five measures of group structure—job autonomy, participation, closeness of supervision, rule usage, and unity of control—found that when the effects of supervision were controlled for, technology related to workgroup structure. Specifically, task manageability, conceptually similar to Perrow's (1967) concept of task variability, was negatively related to job autonomy, participation, and unity of control. Hrebiniak (1974) concludes that on the elimination of supervisory effects, technology may affect group structure to support the technological imperative, but the support is weak.

Van de Ven and Delbecq (1974) collected data on 120 workgroups within a large government employment-security agency. A taxonomy of modes of control and technology was proposed. These researchers proposed two dimensions of technology—task difficulty and task variability—and three structural modes of control—systematized, discretionary, and developmental. They concluded that the design of workgroup structures was affected by task difficulty and task variability. In another study of 197 workgroups in the same agency, Van de Ven, Delbecq, and Koenig (1976) found that perceived task uncertainty and workflow interdependence were associated with different modes of coordination. As task uncertainty increased, mutual work adjustments through horizontal communications channels and group meetings increased. An increased use of coordination mechanisms also was observed when task workflow interdependence increased.

Comstock and Scott (1977), using a sample of 142 patient care wards from 16 acute-care hospitals, tested the proposition that technological predictability affects structure. Task and workflow predictability were found to impact differentially on structure. Workflow predictability was associated with increased centralization of routine decisions and the setting of standards at the workgroup level. More predictable workflows increased bureaucratization and centralization of decision making by the organization. Task predictability was negatively associated with centralization and staff differentiation. Unpredictable tasks reduced staff differentiation, but raised staff qualifications.

Kmetz (1977/1978), using a sample of 74 managers from various departments, attempted to replicate the Aston group's finding (Inkson, Pugh, & Hickson, 1970). Kmetz defined technology as "knowledge" that a person brings to the transformation process, and he restricted his structure measures to those of departmental autonomy and formalization. He found no relationships between technology and structure, even when controlling for size.

Finally, Dewar and Werbel (1979) tested universalistic (there is one best way to organize) and contingency propositions on 52 departments from 13 consumer organizations. Conflict and satisfaction were the dependent measures. They found support for both theoretical positions. A major contingency finding was that when mechanistic controls were used too frequently for the level of technological routineness, satisfaction declined. Frequent use of rules and regulations when work is routine led to a decline in satisfaction. A universalistic finding was that formalization (specifying members' activities with rules and regulations) decreased satisfaction. Similarly, the enforcement of rules and regulations was associated with higher levels of conflict regardless of the routineness of the task.

Two studies have included an effectiveness measure to test a contingency model at the workgroup level. Schoonhoven (1981), in a study of 17 hospital operating rooms, found traditional versions of contingency theory to underrepresent the complexity of relations among technological uncertainty, structure, and effectiveness. She found symmetrical and nonmonotonic interactions among technology, structure, and effectiveness. In conditions of high uncertainty, decentralization had a negative effect on severe morbidity, thus increasing effectiveness. When uncertainty was low, increased decentralization and destandardization resulted in lower effectiveness. She also found that increasing the level of professionalism had an undesirable influence on effectiveness in those units faced with low amounts of workflow uncertainty. The latter finding supports that of Comstock and Scott (1977).

In a study of 30 emergency units located in hospitals, Argote (1982) found that programmed (rules, regulations, scheduled meetings) means of coordination made a greater contribution to organizational effectiveness under conditions of low input uncertainty than high input uncertainty. Conversely, nonprogrammed (general policies, mutual adjustment) means of coordination made a greater contribution to effectiveness when uncertainty was high than when it was low. The use of a particular mode of coordination can increase or decrease the effectiveness of the workgroup, depending on the degree of uncertainty encountered by nurses attending to patients.

Workgroup Technology and Structure Defined

Reviews of the literature (Fry, 1982; Gerwin, 1981; Slocum & Sims, 1980; Withey et al., 1983) reveal a diversity of approaches to the measurement of technology. Perrow (1967, 1970) defined technology as the actions used to transform inputs into outputs. He identified two independent dimensions (few-many exceptions, analyzable-unanalyzable search) along which these transformation processes could be described. These dimensions represent technological uncertainty for several of the previously cited studies. Some of the previous studies collapsed these two dimensions into a routine-nonroutine continuum (Hrebiniak, 1974; Lynch, 1974; Van de Ven et al., 1976). This continuum, however, assumes a positive association between the number of exceptions and search behavior dimensions. The former is

the number of unexpected or novel events that occur in the transformation process. Workgroups with few exceptions experience considerable certainty about the occurrence of task related activities; many exceptions mean that participants typically cannot predict problems or activities in advance. Search behavior is concerned with the analyzability of an exception once it is encountered. Objective or computational procedures usually are followed to resolve analyzable exceptions. For unanalyzable exceptions, few objective or computational procedures are available. Individuals may have to spend time thinking about what to do and initiate search for viable solutions. According to Daft and MacIntosh, "Uncertainty arises from difficulty in seeing into the task and in analyzing it in terms of alternative courses of action, costs, benefits, and outcomes" (1981, p. 209).

A third dimension that has been used to measure workgroup technology is interdependence. Technological interdependence occurs when performance of one or more discrete operations has consequences for the completion of others. Although its implications are not yet fully understood, the concept of interdependence is a fundamental unifying principle in designing organizations (McCann & Galbraith, 1981; Thompson, 1967). Different types of interdependence create different structures and modes of control systems between workers and managers (Slocum & Sims, 1980; Thompson, 1967; Van de Ven & Ferry, 1980).

Taken together, workgroup technology can be conceptualized as having three dimensions:

1. Number of exceptions. The degree to which stimuli are perceived as familiar or unfamiliar (few versus many exceptions) by the members of the workgroup.
2. Search behavior. The nature of the search that is undertaken by individuals when exceptions occur (analyzable versus unanalyzable).
3. Interdependence. The degree to which individuals are dependent on and support others in task accomplishment.

Combining Perrow's (1967) technology and Thompson's (1967) interdependence dimensions, work unit technology can be defined in terms of the extent to which individuals in a workgroup are dependent on the support of others in performing actions requiring search behavior in response to exceptions encountered during the transformation of inputs to outputs.

In recent years, a large number of dimensions have appeared in the literature to tap the structure of an organization. From reviews of this literature (Ford & Slocum, 1977; Gerwin, 1981; Walton, 1981) three dimensions have been chosen that provide the opportunity to test the current formulation: centralization, formalization, and complexity.

1. Centralization: the distribution of authority within the organization. Its main feature is the determination of who has the right to make decisions. Two important aspects of centralization are hierarchy of authority and the degree of participation in the decision making process.

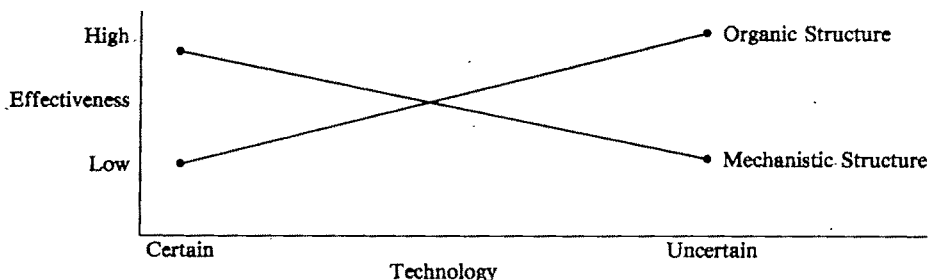
2. Formalization: the degree of job codification and rule observation (Hage & Aiken, 1969). It is an organizational device for prescribing how, when, and by whom tasks are to be performed (Hall, 1977). There are two elements of formalization. One is the existence of rules and procedures, and the second is the organization's exercise of control to enforce these rules and procedures.
3. Specialization: the degree of person specialization (number of occupational specialties) within the organization (Dewar & Hage, 1978).

Hypotheses

Based on Schoonhoven (1981) and Argote (1982), it appears that as technology becomes more uncertain, effective work units become more specialized. Managers design systems that foster decentralization and less formalized procedures. Schoonhoven (1981) has recently criticized contingency theory in general and technology structure research in particular on five grounds. She asserts that there has been a lack of clarity because of the ambiguous character of the hypotheses that have been tested. This criticism is addressed in this section by hypotheses that specify expected workgroup level relationships among technology, structure, and effectiveness. These expectations are based on the review of the contingency literature and prior workgroup studies. Because contingency hypotheses in this area have yet to be adequately supported or refuted, they represent a logical theoretical foundation on which to base this study.

Schoonhoven's (1981) other four criticisms address the nature of contingency relations versus interactions, the nature of the analytic model used, and assumptions about contingency relations. In the present study, interpretation of her criticisms is illustrated in Figure 1. Effective workgroups are hypothesized to have structural characteristics appropriate to their level of technological uncertainty (i.e., mechanistic structure-certain technology; organic structure-uncertain technology). Less effective units are hypothesized to have a "mismatch" between technology and structure (i.e., organic structure-certain technology; mechanistic structure-uncertain technology).

Figure 1
Example of Interaction of Technology and
Structure on Workgroup Effectiveness



Hypothesis 1: Technology, Specialization, and Effectiveness. Galbraith (1977) assumed that the structural arrangement adopted by the organization was a function of the task uncertainty it faced. Alternative structural arrangements varied in their ability to process information and, as a consequence, effectiveness varied with these designs. When task uncertainty was high, organizations relied on a greater number of specialists to handle the uncertainty and reduce the information processing requirements of managers (Dewar & Hage, 1978). Because of the increased difficulty of anticipating and specifying appropriate responses, the use of specialization increases. Galbraith implicitly assumed that when managers were not overloaded with information, they would perform more effectively. When task uncertainty is low and managers adopt specialized structures, there is incongruence between structure, technology, and effectiveness because the organization does not require an elaborate number of specialists to cope with the low uncertainty. The organization can develop an elaborate repertoire of prespecified responses for the individual to make decisions. According to Schoonhoven (1981) and Argote (1982), an individual can rely on the information processed by others to develop an appropriate response and implement this decision.

According to Mowday, Steers, and Porter (1979), commitment and performance positively covary. Therefore, it is argued that combinations of congruent and incongruent structure and technological configurations have similar effects on performance and commitment.

Hypothesis 1: The number of exceptions, search behavior, and interdependence will independently interact with specialization to influence performance and commitment.

Hypothesis 1a: When number of exceptions, search behavior, and interdependence are high, increases in specialization will positively influence performance and commitment.

Hypothesis 1b: When number of exceptions, search behavior, and interdependence are low, increases in specialization will negatively influence performance and commitment.

Hypothesis 2: Technology, Formalization, and Effectiveness. When uncertainty is low, tasks are predictable and task-related rules and procedures can be utilized to guide task execution. As uncertainty increases, however, there are more situations in which reliance on standardized procedures is inappropriate and, therefore, less effective. As uncertainty increases, use of formalized rules and procedures becomes dysfunctional for organizational effectiveness (Argote, 1982; Campbell, 1977; Schoonhoven, 1981). For example, Argote (1982) reported that programmed means of coordination made a greater contribution to effectiveness when input uncertainty was low than when it was high. Under conditions of high uncertainty, the organization usually only specifies outcomes because it cannot efficiently specify activities in advance. Although the organization could attempt to use formalized rules and regulations as a means of reducing the uncertainty, the difficulty of specifying these is likely to be too costly and less effective

than permitting individuals to use their expertise and make decisions on the spot. Hypotheses for formalization are:

Hypothesis 2: Number of exceptions, search behavior, and interdependence will independently interact with formalization to influence performance and commitment.

Hypothesis 2a: When number of exceptions, search behavior, and interdependence are high, increases in formalization will negatively influence performance and commitment.

Hypothesis 2b: When number of exceptions, search behavior, and interdependence are low, increases in formalization will positively influence performance and commitment.

Hypothesis 3: Technology, Span of Control, and Effectiveness. Centralization of decision making at the workgroup level is expected to be associated with greater technological certainty. Centralization is possible because information processing requirements do not overburden the hierarchy with exceptional cases. However, as uncertainty increases, the volume of information required at the point of task execution increases. The span of control must then be reduced so that the number of sources of information and exceptions is brought down to a level that the subunit manager has the capacity to process. One of the most replicated findings in organizational theory is that the span of control of the first-line manager decreases with increases in task complexity and uncertainty (Galbraith, 1977). Hypotheses are:

Hypothesis 3: Number of exceptions, search behavior, and interdependence will independently interact with span of control to influence performance and commitment.

Hypothesis 3a: When number of exceptions, search behavior, and interdependence are high, increases in span of control will negatively influence performance and commitment.

Hypothesis 3b: When number of exceptions, search behavior, and interdependence are low, increases in span of control will positively influence performance and commitment.

Hypothesis 4: Technology, Participation, and Effectiveness. Effective workgroups that have to deal with numerous exceptions, engage in extensive search behavior to discover solutions to problems, and whose team members are highly interdependent should be structured differently from less effective workgroups with similar problems. These groups should actively participate in the gathering of salient data and the implementation of decisions. The more certain the transformation process, the less likely are people to participate in decision making. If work is routine, most decisions are routine. Participants will be more committed if their time is not wasted by involvement in decisions with obvious solutions (Strauss, 1982). Decentralization of decisions would appear applicable when information must be processed by personnel directly in the transformation process. These personnel would participate in the decisions that affect how they perform their tasks. It would be expected that when workers make decisions about

their jobs, they are exercising discretion over work activities and the means used to accomplish these activities. Because one antecedent of commitment is employee participation (Mowday et al., 1979), as task uncertainty increases, participation would be expected to lead to higher levels of commitment and performance.

Hypothesis 4: Number of exceptions, search behaviors, and interdependence will independently interact with participation to influence performance and commitment.

Hypothesis 4a: When number of exceptions, search behavior, and interdependence are high, increases in participation will positively influence performance and commitment.

Hypothesis 4b: When number of exceptions, search behavior, and interdependence are low, increases in participation will negatively influence performance and commitment.

Measures and Analysis

The study was conducted in 61 lower to middle level workgroups of a large, midwestern metropolitan police department. Of 1,295 potential respondents, 785 police officers and support personnel from all levels of the organization voluntarily participated. Data were gathered through questionnaires, study of organizational charts, manuals and other pertinent documents, and interviews with key command personnel. The majority of individuals who did not participate were unable to leave or be relieved from duty at the time their workgroup was assigned to fill out the questionnaire. Of the 785 original questionnaires, 462 were used in this study. The unused questionnaires included respondents who failed to identify their workgroup, failed to respond to one or more of the measures, or were not members of the 61 workgroups included for investigation. Of the respondents, 90 percent were male; 33 percent were under 30 years old, 9 percent were over 50; 10 percent had less than 3 years tenure in the organization, 53 percent had been on the force between 3 and 10 years; 55 percent had a high school education, 32 percent some college, and 7 percent held a bachelor's degree. The organization worked three watches or shifts. Of the respondents, 47 percent worked the first, 28 percent the second, and 25 percent the third. Approximately two weeks after administration, an anonymous mail survey was conducted of all supervisory personnel to gather performance data on subunits they worked closely with. For this, 183 questionnaires were mailed. Of these, 136 (74.3 percent) were returned in usable condition.

Of the 61 subunits, 32 were precincts consisting entirely of police patrol officers. Each precinct had responsibility for patrolling a geographical area. The other subunits performed support and other police functions (e.g., jail bureau, vice, narcotics) that are common to most metropolitan police organizations.

Measures

Technology. No single widely used measurement scale for workgroup technology has yet evolved (Daft & MacIntosh, 1981; Ford & Slocum, 1977; Stanfield, 1976). Initial efforts were directed toward developing scale items to operationalize the three technology dimensions. Some of these items were developed by the researchers, and others were adapted from scales used by other researchers (Ford, 1975; Hrebiniak, 1974; Lynch, 1974; Mohr, 1971; Van de Ven & Delbecq, 1974). A complete description of the factor analysis procedures to establish the construct validity of the measures is given in Fry and Slocum (1981). Sample items from the interdependence scale ($\alpha = .66$) are:

- Mine is a one person job; there is little necessity for working with others (reflected item).

- Working with others as part of a team is a requirement of my job.

Sample exceptions ($\alpha = .80$) items are:

- There is variety in my work.

- Nothing new happens to me on my job in that I do the same tasks every day (reflected item).

Sample search behavior ($\alpha = .64$) items are:

- When I have to search for the answer to a problem, I can easily find the solution (reflected item).

- In my job I can easily find answers to questions I might have (reflected item).

Structure. An objective measure of workgroup specialization was used that takes into account both the absolute number of occupational specialties performed in the group as well as how they are dispersed. Adopted from Samuel and Mannheim (1970) by Ford (1975, 1979), this measure counts the number of occupational specialties within the workgroup and also determines the extent to which individuals are evenly distributed among them. Workgroups are considered highly specialized if they contain many evenly dispersed functions. Dewar and Hage (1978) have noted that both person specialization, which focuses on different kinds of specialized knowledge, and task specialization, which refers to the degree to which a task can be differentiated into parts, can be represented by job title. In this organization, job titles represent occupational specialty (e.g., patrolmen, vice squad, homicide detective). Each job title has its own body of knowledge that must be learned by the person to be an effective member of the workgroup. Therefore, person specialization is being measured in this study.

A measure of hierarchy of authority or span of control was used—the Samuel and Mannheim (1970) hierarchy of control index (the inverse of number of subordinates for a supervisor). Ford (1975) notes that the scale is similar to the Pugh, Hickson, and Turner (1968) configuration scale that measures span of control with high scores representing tall structures and low scores representing flat structures.

The perceptual measures of participation (alpha equals .65) and formalization (alpha equals .70) were developed by Ford (1975).

Performance. Interviews and organizational documents established that the sample organization possessed extensive paramilitary and rigid bureaucratic features characteristic of most police organizations (Fry & Berkes, 1983; Jermier & Berkes, 1979; Van Maanen, 1975). There were many rules, regulations, and standard operating procedures. Extensive socialization and training of police officers to develop the necessary service ideology was employed. A centralized dispatching and radio communications center was used by the organization to ensure almost constant contact with police officers in the field.

Lefkowitz (1977), Lee, Malone, and Greco (1981), and Jobson and Schneck (1982) in their reviews of police studies found no measures of police performance to be reliable or valid across groups. Because of the lack of specific performance measures, the 8-item effectiveness measure developed by Mott (1972) for small government agencies was used. The factor analysis reported by Mott (1972) revealed three factors: a productivity dimension, flexibility and symbolic adaptability, and behavioral adaptability.

These scales had not been used to examine effectiveness of police subunits. The factor structure reported by Mott (1972) was empirically investigated. The effectiveness measure was mailed anonymously to all supervisors. Supervisors were asked to rate the performance of three subunits with which they interacted most frequently and were in a position to have observed the units' performance. Obtained were 241 usable multiple ratings of 35 subunits. A one-way ANOVA revealed significant interrater agreement on ratings ($F=3.11, p<.001$). Supervisor effectiveness ratings of these work units were factor analyzed. For this sample, only one factor was extracted (eigenvalue = 6.12; percent of explained variance = 76.5). The respondents were not able to distinguish production, adaptation, and flexibility as independent dimensions of police performance. Therefore, this study treated effectiveness as a unidimensional construct by summing the eight items to arrive at an overall workgroup effectiveness score ($\alpha = .96$). A similar procedure had been followed by Fulk and Wendler (1982), who reported an internal reliability of $\alpha = .84$ in their study of managerial and clerical employees.

To examine the validity of the instrument, individual officers were asked to rate the effectiveness of their own subunit, using the Mott scales. It was factor analyzed and found to be unidimensional and highly reliable ($\alpha = .88$). The two measures were found to be positively correlated ($r = .33, p < .01$), providing some indication of convergent validity between these two measures.

Porter, Steers, Mowday, and Boulian's (1974) 15-item organizational commitment scale was used to measure the individual's identification with and involvement in the police department. This scale combines attitudes and behavioral intentions, two important aspects of commitment, into a summative index of commitment. Mowday et al. (1979) and Ferris and Aranya (1983) have reviewed the psychometric properties of this scale. Internal consistency reliabilities range from .82 to .93. In Van Maanen's (1975) study

of urban police departments, he reported the internal consistency reliability of this scale was .73; in the present study it was $\alpha = .89$.

Analysis

The unit of analysis for this study was the work unit ($N = 61$ for commitment; $N = 35$ for effectiveness). The hypotheses are concerned with contingency factors affecting workgroup effectiveness. Following the procedure utilized by Daft and MacIntosh (1981), work unit scores for all perceptual scales were computed by averaging the scores of respondents from each work unit. Equal weight was given for each individual. This procedure assumes homogeneity of intraunit responses. To test this assumption, a series of one-way analyses of variance was performed. These analyses indicated that individuals within a subunit were responding to similar dimensions of structure (specialization, $F = 1.76$, $p < .01$; formalization, $F = 2.35$, $p < .01$; hierarchy of control, $F = 2.43$, $p < .01$; and participation, $F = 1.99$, $p < .01$). The null hypothesis that individuals within a subunit were responding to similar tasks was rejected for the technological dimensions of number of exceptions ($F = 1.57$, $p < .01$), interdependence ($F = 1.87$, $p < .01$), and search behavior ($F = 1.38$, $p < .04$). The null hypothesis that individuals were responding similarly across all workgroups therefore was rejected.

The hypotheses were tested using a modification of the procedure outlined by Arnold (1982) for testing contingency models. In this study, interactions between technology and structure for effectiveness were hypothesized. The form of relationships between structure and effectiveness is contingent on technology. Arnold advocates the use of hierarchical multiple regression for testing complex forms of interaction. Following his procedure, one must first partial out all the lower order main effects from any higher order interaction effects. This is accomplished by testing the incremental R^2 between an equation containing all lower order terms and an equation containing these lower order terms plus the hypothesized higher order effects.

In the present analysis, hierarchical and stepwise regression modes of analysis were combined. The hierarchical analysis enabled a regression of the technology and structure variables on effectiveness to test for universalistic or main effects. To test for contingency effects, the technology \times structure interaction variables were regressed stepwise on effectiveness and an F -ratio (Cohen, 1968) for the R^2 increment was computed at each step. The stepwise procedure provides for an orderly entry of the interactions in terms of their ability to add incrementally to the explained variance of the dependent variable. The procedure was terminated when the adjusted R^2 increment failed to increase significantly ($p < .05$) with the inclusion of the additional variable. The hypotheses predict technology \times structure interactions to impact effectiveness significantly. The universal (or main) effects of technology and structure and the technology \times technology interactions were not hypothesized to be significant determinants of effectiveness.

In the construction of the interaction or fit variables, the technique used by Dewar and Werbel (1979) was followed. The fit score was constructed of the standardized residuals from the regressions of each structure variable on the technology variables. The residuals of these variables are the scores of congruence or fit (low scores, good fit; high scores, poor fit). With this technique, one can obtain some idea of the magnitude of the different effects by comparing standardized regression coefficients. In using this method, multicollinearity usually is less of a problem than in the standard multiple regression procedure, which uses multiplicative interaction terms.

Results

Table 1 shows the zero-order correlation coefficients for the study's variables. Significant negative correlations within the technology dimensions were obtained between number of exceptions and search behavior and interdependence. Workgroups reporting higher incidences of exceptional cases were able to find solutions through more analyzable search behaviors than were workgroups reporting fewer exceptional cases. This organization developed a repertoire of alternative plans for handling cases that exhibited moderate variation so that analyzable search procedures could be used by the police officers. These procedures were fairly well defined in operating manuals and required minimal coordination between members of the workgroup to be implemented.

The within structure correlations followed the general pattern of previous workgroup level studies (Fry, 1982; Gerwin, 1981). Officers in charge of multiple speciality units enforced fewer rules and regulations and had narrower spans of control than did officers heading workgroups with fewer specialties. Patrolmen in more specialized workgroups reported greater participation in decisions that directly affected their workgroup ($r = .23$; $p < .05$) than did patrolmen in less specialized workgroups. The greater reliance on rules and regulations established by a supervisor to control the behavior of subordinates, the wider the span of control ($r = -.34$; $p < .01$). The rules and regulations may act as a substitute for the personal contact of the officer in charge to control the behaviors of patrolmen assigned to him (Kerr & Slocum, 1981). This logic is supported by a correlation between span of control and participation ($r = .38$; $p < .01$). The narrower the span of control, the more the patrolmen indicated that they participated in decisions that affected their work.

Technology and Structure Correlations

There was no relationship among specialization, search behavior, and interdependence. A negative relationship with exceptions and specialization was found ($r = -.30$; $p < .01$). The greater the number of exceptions encountered by the workgroup, the fewer the number of disparate functions it performed.

Table 1
Variable Means, Standard Deviations, and Zero-Order Correlations
Between Technology, Structure, and Effectiveness Variables^a

	Number of Items	Mean	Standard Deviation	1	2	3	4	5	6	7	8	9
<i>Technology</i>												
1. Exceptions	5	17.44	1.649									
2. Search behavior	2	4.62	.669	-.37**								
3. Interdependence	7	23.03	2.312	-.21*	.10							
<i>Structure</i>												
4. Specialization	—	2.91	2.935	-.30**	.10	.12						
5. Formalization	3	11.58	1.608	.24**	-.37**	.07	-.37**					
6. Span of control	—	.062	.063	-.11	.33**	.12	.44**	-.34**				
7. Participation	4	11.62	1.865	-.05	-.04	.14	.23*	-.31**	.38**			
<i>Effectiveness</i>												
8. Organization commitment ^b	15	70.17	9.781	.15	.01	-.02	.23*	-.13	.40**	.31**		
9. Supervisor performance ratings ^c	8	28.44	5.360	-.28*	.09	.12	-.19	.07	-.23	-.25	-.32*	

^aCorrelations computed using pairwise deletion option of SPSS.

^bSeven-point response scale. All other scales utilized five response categories ranging from almost always untrue to almost always true.

^cN = 35 for supervisor performance rating correlations using Mott (1972) effectiveness measure.

* $p < .05$

** $p < .01$

Technology and Formalization. The correlation between exceptions and formalization was significant ($r = .24$; $p < .01$), but in the opposite direction of what was expected. From previous research, it was assumed that formalization would become more difficult to institute as the number of exceptions confronting the workgroup increased. Because the workgroups in this organization reporting more exceptional cases also reported these to be more analyzable, it makes sense that the organization would design more rules and regulations to govern the behavior of employees within these workgroups. Search behavior and formalization did correlate as expected ($r = -.37$; $p < .01$). Workgroups encountering fewer exceptions were less formalized, more specialized, and required greater levels of search behavior. According to Van de Ven et al. (1976), under these conditions management should implement a discretionary mode of control. Discretionary control consists of management's setting up repertoires of alternative plans for handling problems, setting guidelines for exercising discretion in situations, and specifying expected codes for behavior. The discretionary mode is created by management for employees who are handling tasks that are sufficiently complex that they require evaluation, search, and judgment.

Technology and Centralization. Centralization is a decision making process that refers to the distribution of authority within an organization. Narrow spans of control were expected and were found to be inversely related to the workgroups' search behaviors ($r = .33$; $p < .01$). As the span of control narrowed (larger ratio of police supervisors to patrolmen), the patrolmen encountered more unanalyzable search behaviors.

The expectation that participation would be positively related to exceptions and search behavior was not confirmed. The fact that this organization used a discretionary mode of control might explain this finding. Because most search procedures were codified and required little problem solving communication between patrolmen and command, the use of participation as a vehicle to solve these problems became less important. The participation and interdependence correlation was not significant. This is contrary to what others (Hrebiniak, 1974; Mohr, 1971; Sutton & Rousseau, 1979; Van de Ven et al., 1976) have found.

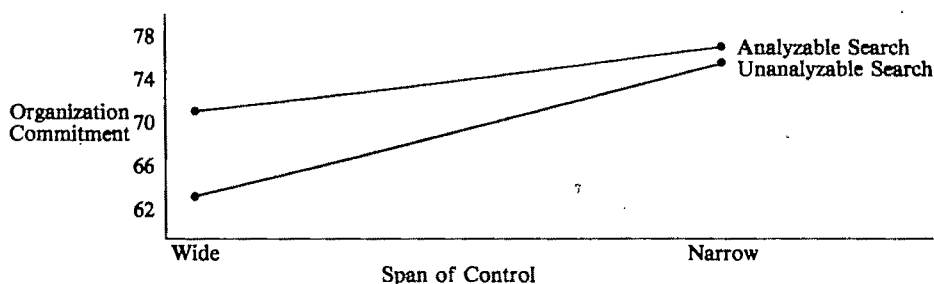
Contingency Hypotheses

The hierarchical and stepwise regressions of technology and structure on both measures of effectiveness were analyzed. Each regression includes a structure variable and the three technology variables plus the interaction variables that incrementally added to the adjusted R^2 ($p < .01$). The standardized regression coefficients, unadjusted R^2 change, and F -ratio for structure and the three technology variables reflect each variable's individual contribution to a simple regression equation on effectiveness. The standardized regression coefficients, unadjusted R^2 change, and F -ratio for the interaction terms reflect the stepwise inclusion of these variables into the regression analysis.

Commitment. The interactive hypotheses for commitment were not supported. (These tables are available on request from the first author. They were deleted because most of the interactions supporting the hypotheses were not significant.) Only two interactions reached statistical significance, and the adjusted R^2 of the model was significant for only one. Kirk (1968) notes that whenever a significant interaction is found, interpretation of main effects should be made with caution.

To help interpret the findings, the technology and structure variables were dichotomized at the median. Results of t -tests indicated that all high-low groups were significantly different ($p < .01$). Significant interactions were then graphed using the mean scores for each of the four (high-high, high-low, low-high, low-low) cells. Figure 2 graphs the significant search \times span of control interaction on commitment.

Figure 2
Interaction of Search \times Span of Control on
Organization Commitment^a



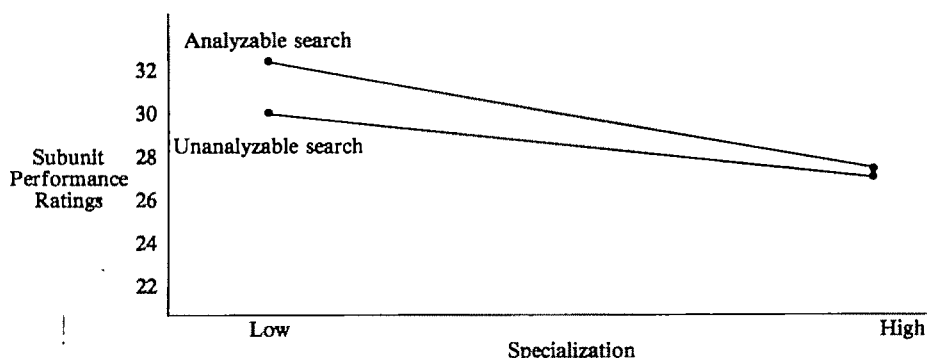
^aThe adjusted R^2 for this regression equation is .27, which is significant at $p < .01$.

Figure 2 provides support for Hypothesis 3a. Narrow spans of control lead to higher commitment than do wide spans when search is unanalyzable ($b = .71$, $F = 6.32$, $p < .05$). Hypothesis 3b was rejected. Commitment was highest in workgroups in which the span of control was narrow and employees could follow analyzable search procedures.

Two structural variables had significant main effects on commitment. The more specialized workgroups were more committed ($b = .32$, $F = 5.54$, $p < .05$) to the force than were less specialized workgroups. Workgroups whose members participated in salient decisions affecting the group were more committed ($b = .33$, $F = 6.96$, $p < .01$) than were workgroups whose members did not participate in the decision making process.

Performance. Only one interaction was significant for the workgroup performance criterion. This interaction is shown in Figure 3. The results are opposite to the first hypotheses. The more specialized subunits were rated lower in performance regardless of type of search behavior. The number of exceptions had a significant main effect on performance ($b = -.40$ and

Figure 3
Interaction of Search \times Specialization on
Subunit Performance Ratings^a



^aThe adjusted R^2 for this regression equation is .29, which is significant at $p < .01$ level.

$b = -.37, p < .05$). Those workgroups reporting more exceptions were rated lower than those workgroups not reporting as many exceptions up the chain of command.

A Posteriori Analyses

According to Withey et al. (1983), it is highly likely that the technological dimensions used by researchers interact to affect significantly the dependent variables. To explore further this potential interaction between the three technological dimensions, it was decided to rerun the regressions to determine what effect the inclusion of the three possible technology-technology interactions (exceptions \times search; search \times interdependence; exceptions \times interdependence) might have on the initial findings. Results of these analyses indicated that although the exception \times interdependence and search \times interdependence regressions added explained variance to the commitment regressions, the additions were not significant. Therefore, the commitment results basically stay the same.

When performance was the dependent variable, the explanatory power of these regressions was significantly increased by the inclusion of the exceptions \times interdependence and search \times interdependence interactions. These are illustrated in Table 2. The original specialization main effect and search \times specialization interaction were overshadowed by technology, thereby diminishing the importance of specialization on the performance ratings. These interactions are graphed in Figures 4 and 5.

Workgroups reporting few exceptions were rated highest in performance regardless of degree of interdependence. This illustrates a dominating exceptions main effect. High exceptions, high interdependent workgroups were rated more effective than low exceptions, low interdependent workgroups. Workgroups that adopted analyzable search procedures were rated about

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Table 2
Effects of Technology Variables on Relationships Between
Dimensions of Structure and Workgroup Performance Ratings
Including Technology \times Technology Interactions

<i>Independent Variables</i>	<i>Standardized Regression Coefficient</i>	<i>Unadjusted R² Change</i>	<i>F-Ratio^a</i>
<i>Technology and specialization</i>			
Specialization	-.54	.086	2.19
Interdependence	.07	.001	.20
Exceptions	-.43	.111	7.76*
Search	-.21	.035	1.80
Interdependence \times search	-.28	.176	7.42*
Exceptions \times interdependence	-.32	.081	3.80
Search \times specialization	.47	.035	1.72
Unadjusted R ²		.525	
Adjusted R ²		.381**	
<i>Technology and formalization</i>			
Formalization	-.06	.015	.12
Interdependence	.17	.013	1.11
Exceptions	-.58	.081	12.91**
Search	-.40	.038	6.36*
Exceptions \times interdependence	-.52	.224	10.25**
Search \times formalization	-.38	.089	3.57
Unadjusted R ²		.460	
Adjusted R ²		.338**	
<i>Technology and span of control</i>			
Span of control	-.23	.032	2.11
Interdependence	.08	.001	.29
Exceptions	-.43	.111	8.63**
Search	-.09	.035	.30
Exceptions \times interdependence	-.40	.228	9.24**
Interdependence \times search	-.36	.114	5.74*
Unadjusted R ²		.521	
Adjusted R ²		.403**	
<i>Technology and participation</i>			
Participation	-.22	.043	2.25
Interdependence	.29	.013	3.35
Exceptions	-.44	.081	6.87**
Search	-.35	.038	4.71*
Exceptions \times interdependence	-.53	.222	10.67**
Unadjusted R ²		.397	
Adjusted R ²		.292**	

^aF values for the main effects are for each individual variable and are not incremental F-ratios. F values for interaction terms are based on incremental R² and are computed using the equation developed by Cohen (1968).

* $p < .05$

** $p < .01$

the same in performance regardless of level of interdependence. High interdependent unanalyzable search workgroups were rated slightly higher than their low interdependent counterparts.

Discussion

The pattern of results supports both universalistic and contingency theoretical positions. In general, however, the bulk of the results supports Schoonhoven's (1981) proposition that traditional versions of contingency

Figure 4
Interaction of Exceptions \times Interdependence on
Subunit Performance Ratings

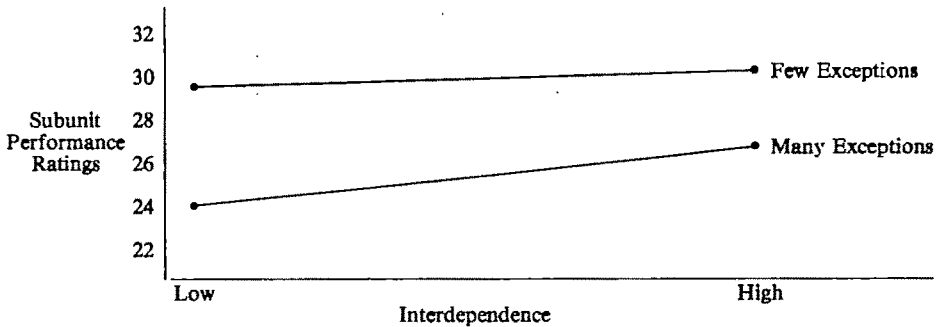
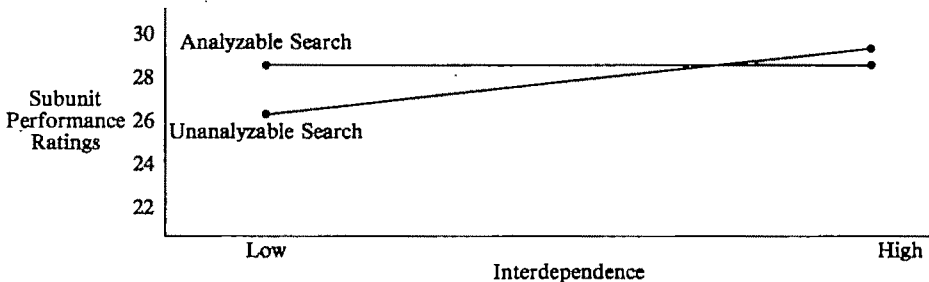


Figure 5
Interaction of Search \times Interdependence on
Subunit Performance Ratings



theory underrepresent the complexity of relations among dimensions of technology, structure, and organizational effectiveness. Most notable was the unexpected manner in which exceptions correlated with other technology, structure, and effectiveness variables. Here it was not hypothesized that individual technological dimensions directly or interactively would influence effectiveness.

The negative relationship between exceptions with search behavior and interdependence gives an indication of systematic covariation among technology variables. Workgroups reporting more exceptions were able to find solutions through more analyzable search procedures that required little interdependence among others in their group (e.g., marine park patrol third watch, planning and research bureau, jail bureau third watch) to complete the task. These workgroups also were less complex and more formalized than workgroups reporting fewer exceptions. Workgroups reporting unanalyzable situations (e.g., crime scene search unit, accident investigation squad, detective bureau crimes against property second watch) reported fewer of them to their superiors than did workgroups facing more analyzable situations.

Perrow (1967) originally conceptualized his exceptions and search technology dimensions as independent organization level variables. Research on his typology, however, has been conducted mostly on the routine-non-routine categories with workgroups. The present findings, however, represent Perrow's (1967) craft-engineering categories. Perrow notes that all four quadrants represent viable cases in themselves, and he gives industrial examples for each one. For him, the kind of technology that is used by the organization is dependent on the state of the art of analyzing the characteristics of the raw material or object to be changed:

To understand the nature of the material means to be able to control it better and achieve more predictability in transformation. We are not referring to the "essence" of the material, only to the way the organization itself perceives it (1967, p. 198).

Organizations, therefore, seek to standardize their raw material to minimize exceptional situations.

The raw material (i.e., law breakers) is particularly difficult to standardize in police organizations. Police subunits apparently are either able to reduce the variability of the material and thus the number of exceptional cases (craft technology), or they are able to increase their knowledge of the material, thus allowing more analytic techniques to be used in handling higher numbers of exceptional cases (engineering technology). They are less able to reduce the raw material's variability and also gain enough knowledge of it to utilize a routine technology.

Police organizations evidently use structure (e.g., formalization) to minimize the number of exceptions passed up the chain of command. Police work resembles a teamlike activity with occupational norms that preclude questioning judgments made by another officer (Fry & Berkes, 1983; Hazer & Alvares, 1981; Jermier & Berkes, 1979; Van Maanen, 1975). Unanalyzable situations, in which workgroup members have to spend time thinking about what to do and/or actively search for solutions beyond normal procedures, are handled within the group.

The unexpected results between commitment and performance warrant some discussion. A significant negative correlation was found between commitment and performance ($r = -.32, p < .05$). Van Maanen (1975) found that sergeants tended to perceive those policemen who expressed more commitment to the department not performing significantly better than those less committed to the department. Commitment was affected by tenure on the force: the greater the tenure, the less the commitment. Similar results have been found by Hazer and Alvares (1981) in their study of police recruits. The traditional positive linkage between performance and commitment may have to be more closely examined.

Performance

Results for supervisory performance ratings reveal unexpected within-technology interactions and universalistic effects. Structure had little impact on performance ratings. Workgroups rated higher on performance

faced fewer exceptions, engaged in analyzable search behaviors, or were more highly interdependent than workgroups rated as poor performers.

The emerging profile of effective workgroups suggests that they must exhibit a behavior of "relatively unquestioning belief in and acceptance of the organization system with little participation in decision making" (Van Maanen, 1975, p. 222). If exceptions arise, effective workgroups handle them without involving their superiors or taking them through channels. Workgroups that could not cope with exceptions by following standard operating procedures and had to rely on others' advice were not following the values of the organization (Hazer & Alvares, 1981). The formal status hierarchy of a paramilitary organization creates obstacles to the free exchange of information. According to Van Maanen, the police culture of "lay low, hang loose, and don't expect too much advice" (1975, p. 225) is characteristic of effective workgroups.

Commitment

Both universalistic and contingency effects were found to influence a workgroup's commitment to the organization. Highly committed workgroups performed more specialized functions with members who participated in decisions affecting their specialized line of work. These findings are consistent with those reported by Dewar and Werbel (1979) and most major reviews of the commitment literature (Weiner, 1982).

All of the significant contingency effects involved technology and structure. Highly committed workgroups: (1) faced a high number of exceptions; (2) were less formalized and reported few exceptions; or (3) had supervisors that adopted narrower spans of control. The enforcement of rules and regulations in these workgroups was difficult because they were deployed over geographical areas, making control by direct command almost impossible. Because the lowest ranking people make most of the important decisions and face an array of problems, the ability to participate in decisions affecting the welfare of the workgroup is critical to ensuring that when help is needed by fellow officers, it quickly follows. Homicide, burglary, vice, and narcotics workgroups are examples. For most of these workgroups, the number of exceptions is high. For example, if a burglary is in progress, it requires teamwork to analyze the situation and determine how to approach the scene of the crime. There is great personal latitude in the interpretation of which way(s) to proceed. Members sometimes go beyond "official" role requirements because these can be perceived as not being adaptable to the unpredictable street-level environment. The high uncertainty creates a need for more participation among workgroup members during the search process. The police officers' ability to cope with a wide variety of situations, using peers instead of supervisors for guidance, fosters a high level of workgroup commitment.

Conclusions

Three points emerge from this research. First, this study reinforces the multidimensional view of effectiveness. Complex police organizations cannot be evaluated on one criterion. In this study, one criterion may be met at some expense of the other because both cannot be completely satisfied simultaneously. Because no one criterion can be maximized, different structural and/or technological arrangements fostering potential conflicts seem inherent. In this study, police units may resolve conflicting demands to increase "commitment" or "performance" by increasing participation or by following rules and regulations and minimizing exceptional situations. Simultaneous conditions of incompatibility and compatibility among a myriad and dynamic set of structural and technological configurations may be the reality of service organizations (Campbell, 1977).

Second, these data reinforce Schoonhoven's (1981) position that more clearly articulated arguments need to be established to test contingency propositions. The traditional assumptions that technological uncertainty requires an organic structure, or that technological certainty requires a mechanistic structure, need to be rethought. For example, it may be that human service organizations adopt sets of technology-structure configurations different from those adopted by other organizational types because of their inability to measure performance adequately.

Hasenfeld and English (1974) have noted the general tendency for all human service organizations to develop service ideologies that introduce some order and coherence in the work performed by the staff. This ideology provides organizational members with rational and legitimate courses of actions that are often self-confirming and reduce efforts to engage in technological or organizational innovations. The paramilitary organizational model is such an ideology. Although the universal prescriptions embedded in the model have been called oversimplified and stereotyped (Fry & Berkes, 1983; Jermier & Berkes, 1979), it would have been difficult to explain present results without reference to it.

Finally, there are two theoretical positions for testing contingency propositions. The first is to determine whether the degree of the relationship between two variables varies by the inclusion of some third variable (Arnold, 1982). Testing for different degrees of a relationship between structure and effectiveness requires testing the differences of correlation coefficients for different values of the moderator variable (technology). The second method to test for contingency variables is accomplished by examining the form of that relationship. To examine the form of the relationship requires the researcher to specify that a dependent variable (organizational effectiveness) is a joint function of an independent (structure) and moderator variable (technology). Because contingency theorists generally are interested in the form of the relationship and assume that congruent relationships are more effective than incongruent relationships, a general congruency position has been taken by researchers and gone unchallenged in the

literature. Joyce, Slocum, and Von Glinow (1982) indicate that there are three forms of congruency: effect, general, and functional.

Effect congruency concerns the relative importance of individual and situational factors in explaining behavior. Proponents of this model argue that characteristics of both the situation and the individual are important influences on behavior. This suggests a more-is-better perspective in which it is assumed that variance explained will continue to be improved as additional independent variables, reflecting attributes of both the individual and situation, are added. This model stresses the consequences of the main effects of potentially interacting variables. This type of additive interaction was found in Figure 4 of the current research. In Figure 4, those workgroups reporting fewer exceptions were rated more highly regardless of the type of interdependence. In this case, if testing had been done for an effect congruency, the hypothesis would have been supported.

The general congruency model traditionally has been the model assumed by contingency theorists. Here, congruency exists when conceptually similar dimensions of the independent variables are correspondingly high or low. Congruency is determined by this fit between independent variables. Unlike effect congruency, the general congruency model hypothesizes interaction effects and emphasizes the similarity and matching of levels of independent variables as determinants of performance. The hypotheses tested by Schoonhoven, Argote, and the present authors represent a form of interaction. This form of interaction is illustrated in Figure 1: Unfortunately, the present data do not support this model.

Functional congruency differs from effect and general congruency models in that it does not argue that more is better or that a general congruency between predictors should result in high criteria levels. The functional congruency model suggests that either one or the other independent variable may be sufficient to lead to high levels of effectiveness, but the joint occurrence of both may do little to improve effectiveness. The data in Figure 5 are illustrative of this type of congruency. These data indicate that either search or interdependence affects performance, but the joint occurrence of both has little impact on effectiveness.

In future research, the form of "fit" needs to be a priori stated. Because there has been so little research testing contingency propositions, it is difficult to hypothesize these different forms of congruency. Congruency has been the dominant paradigm in the literature, but perhaps it needs to be reconstructed.

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Computerization as a Predominate Technology: Its Influence on the Structure of Newspaper Organizations¹

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Newspaper organizations were examined for the influence of computerization, when viewed as the predominate organizational technology, on the locus of decision making and division of labor. The relative impact of the computer was found to depend on the specific tasks for which it was used, but organization size moderated the technology-structure relationship.

Much of the research undertaken in the attempt to understand and predict organizational structure has focused on the technical process an organization utilizes to change inputs into outputs. Given the rapidity of advancements that technological processes have undergone in the past 20 years, particularly due to computerization, it is not surprising that a number of researchers have included computer usage as part of their operationalization of the technology conception (Blau, Falbe, McKinley, & Tracy, 1976; Klatzky, 1970; Meyer, 1968). Generally in these studies the computer has been viewed as information technology concerned with the processing of data and information, or as machinery facilitating automation as a part of operations technology. Although little consensus has yet been reached concerning the influence of computerization on specific structural dimensions, there seems to be general agreement that the impact of computer technology has been local rather than global. That is, its influence has been evidenced at the subunit or subsystem level. Edström and Naugès (1975) attributed these findings to the likelihood that top management does not perceive of the possibilities the computer holds across the organization, but it does recognize the need for its local use.

Another explanation, and one pursued in this paper, is that computer utilization in many of the organizations studied was contained within only

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a few functional areas or production activities, primarily data processing. Even within insurance companies, which are paper processing organizations and have experienced far-reaching changes as a result of the rapid progress in computer technology, the computer was used predominately for mass data processing in connection with the basic stages of operations (e.g., correspondence, policy amendments, policy cancellations) (Schareck & Barten, 1975).

It is not surprising, then, that the research findings have identified the impact of the computer on the organization's structure at the subsystem level. The question remains whether the global structure would be influenced if the applications of the computer were more encompassing. It was the purpose of the present research to explore this question. Specifically, the intention was to study organizations in which the computer has been adapted to the entire work flow process and acts as an integrative device, coupling systems with interacting activities—in essence, organizations in which the computer has become the predominate technology.

The Computer as Organization Technology

At the most general level, organizational technology has been defined as the process of transforming inputs into outputs (Fry, 1982). Refinements of this definition have emphasized such elements as facilities and plant layouts, the characteristics of raw materials, rates of change in production methods, knowledge required in transformation processes as well as task interdependence, task predictability and problem analyzability (Perrow, 1970; Reeves, Turner, & Woodward, 1970; Rushing, 1968; Thompson, 1967). A number of researchers have taken a multidimensional approach to define a more comprehensive view of technology (Blau et al., 1976; Hrebiniak, 1974; Mohr, 1971). Representative of this approach is Khandwalla's (1977) conceptualization, which distinguished three aspects of work: (1) work flow—the way in which programs, activities, and events in the input-process-output cycle of the organization are sequenced; (2) operations technology—the role of mechanical aids in transforming inputs to the work flow into the outputs of the work flow; and (3) information technology—the role that mechanical aids play in transforming information inputs into informational outputs.

Within the traditional model of organizational technology, each of Khandwalla's three aspects of work is viewed as a separate component of the overall technology. The means by which work is accomplished in each component is distinct and varied. When the computer has been included in this model its use generally has been seen in information technology and to a much lesser extent as part of operations technology. It is easy to speculate, however, given the touted potential of the computer, how computerization could be the predominate means of work accomplishment in each of the three components. Specifically, the optimal sequencing of programs and activities can be planned as well as executed through the use of the

computer. Similarly, it can act as the mechanical means of transforming inputs into outputs, whether directly—that is, paper processing is the product outcome—or indirectly as it “drives” other machinery. And, finally, it can act as the central component of information technology, transforming information inputs into information outputs. In addition to the computer’s subsuming the activities in each of these three components, it also serves as an integrative mechanism providing the input/output linkage among the various subunits. As such, it can be argued that the computer emerges as the primary technology in these organizations.

For a number of organizations today (banks, oil refineries, stock brokerages) the possibility that the computer is thus represented is realized. The question to be answered is whether the extended utilization of the computer in these organizations has a differential influence on their structure than if its applications were limited to only a few functional areas.

In pursuing this question, several issues concerned with operationalizing the extended conceptualization must be addressed. First, there is the question of the appropriateness of modal versus unit analyses. Randolph (1980) has described modal measures of technology as aggregates of the various technologies represented in an organization; for example, a total organization measurement comprised of the various subunit technologies. The unit approach, on the other hand, sacrifices the generalizability of an overall measure to explore the peculiarities of each subunit technology.

The intention of the present study is to assess the influence of computerization on the global structure and to this end it has been argued that the computer represents a commonality in each of the three components identified by Khandwalla. It also is apparent, however, that the actual means of application in each component is likely to vary considerably. A modal approach would fail to capture this diversity in utilization, particularly in larger and more complex organizations. Thus, a paradox is presented. On the one hand, unit measures are preferred to tap the differences in subunit applications; on the other hand, a modal orientation is desired to avoid violation of cross-level inferences. It is important to note that a modal orientation is not simply a sum of subunit assessments. Glick (1980), in an insightful discussion of the problems of cross-level inferences, argued that although objectively there is an interdependence between the constituent parts and its larger unit, organizational-level constructs may have theoretical meanings and patterns of association that differ from subunit-level constructs. If relations across these two levels are of interest, cross-level discrepancies can be avoided by selecting theoretical units and levels that match the units and levels of design, measurement, and analysis. Although the intent of the present study is to assess the influence of the computer on the global structure, or a modal orientation, the actual computer applications are the units of interest. Thus, a unit orientation to technology is proposed to appraise the units’ influence on the modal structure.

Another important aspect underlying the extended conceptualization is the notion that computerization can be represented as a continuum or

relative extent of usage rather than as simply whether the organization had a computer; whether it was on- or off-site; or by counting the number of subunits or functional departments making use of the computer. In this way, both the extent and actual usage to which the computer is put can be appraised. To achieve a more precise measure that taps both of these dimensions, not only are multiple subunit measures necessary, but also assessments concerning the extent and manner in which the computer is used.

Structural Dimensions

As Hedberg, Edström, Muller, and Wilpert (1975) have noted, the implementation of computer technology has multiple effects. Significant changes are likely to occur in what Bakke (1959) has categorized as activity variables (perpetuation, work flow, control, homeostasis) as well as changes in the structural dimensions that act as mechanisms to conduct, coordinate, and control work activities. Given the diversity of computer technology's influence and the contradictions that have been reported in the literature, it seems prudent to confine the present study to one or a few dimensions that appear to be of critical importance. Two structural dimensions that have been pursued in the literature are thus adopted in this study, not only as they represent elements for which the computer potentially has far reaching impact, but also as the basis for comparing the results of previous studies with those resulting from the extended conceptualization in this study. These dimensions are the locus of decision authority and the division of labor. The theoretical importance of selecting these variables is more apparent in the following discussions.

Locus of Decision Authority

Despite the general agreement that computerization presents management of organizations with new possibilities and alternatives in decision making practices, the issue of whether computerization tends to facilitate a centralization of authority within organizations or whether its potential for monitoring activities instead favors a decentralizing trend has yet to be resolved. Particularly for larger organizations, the notion that the computer provides a means of collecting and processing large amounts of data and information, thus enabling a small number of persons effectively to control authority and decision making, has been forwarded by several researchers (Reif, 1968; Rourke & Brooks, 1967; Whisler, 1970). Opponents of this perspective (Blau & Schoenherr, 1971; Klatzky, 1970; Pfeffer & Leblebici, 1977) have argued that it is precisely this capability of computers to gather and process information rapidly that facilitates decentralizing the decision making. This group of researchers maintains that the computer's potential for both routinizing activities and providing middle management with easy access to information serves to strengthen mid-managers' expertise by allowing greater discretion in decision making affecting their respective

functional areas. Upper management, once reluctant to release and delegate authority, now would feel more confident about decentralizing decision making, knowing that the computer can be relied on as a monitoring device capable of alerting them to the need for any necessary emergency action. This delegation then would free top management to concentrate on more pressing obligations.

The inconsistencies in these two sets of literature would seem to provide little direction for hypothesizing the influence of the extended conceptualization. However, if viewed historically, the discrepancies may be partially explained. Those studies dated after 1970 tend to support the trend toward decentralization; those dated prior to that time favored centralization. The difference between the two sets of findings may be a function of a learning curve (increased familiarity with equipment) or technical advancements of computer equipment. It seems reasonable to expect that organizations studied prior to 1970 were likely much less familiar with the innovative technology and their applications were constrained by the level of development of hardware and software. Thus, their usage of the computer perhaps was quite different from that in organizations included in later studies. As organizations became more familiar with the computer, either through direct use or vicariously by observing others, and the sophistication of the equipment and software advanced, organizations were apt to become more adept at integrating it into their work processes. The adoption of this argument leads to the proposition that as computer applications become more pervasive in the organization and are assimilated through the work flow process such that they become the predominate technology, upper management levels will be released from the day-to-day encumbrances of centralized decision making. Thus, *as the extent of computer utilization increases in subunit applications, the locus of decision authority will become more decentralized in the organization.*

Division of Labor

Proponents of computerization have argued that its implementation would lead to increased efficiency and cost reductions in organizations. In response, opponents have been concerned that the "opportunity cost" of that advantage would be borne by personnel whose positions were eliminated (Roberts, 1973). Whichever perspective is adopted, most would agree with Whisler (1970) that computerization predicts radical changes in the structure of departments, and groups within the company. At a minimum it can be argued the functional differentiation of the organization will be altered by the mechanical aspects of the computer that necessitate the creation of new positions or retraining of personnel whose purpose is to operate the new technology (i.e., operators and programmers). Similarly, changes in functional specialization will result, reflecting the acquisition of new skills, knowledge, or expertise required by organization members to utilize the computer in the actual day-to-day work flow processes. As the integration

of the computer continues to permeate the organization, changes in functional specialization are apt to become even more pronounced as individuals become increasingly responsible for providing the interface between functional areas via the computer. Finally, a redistribution in the concentration of personnel, or a shift in functional diversification, is likely to occur. This redistribution may transpire as a function of certain positions or even entire subunits assuming increased responsibilities (i.e., decision making), which necessitates the addition of personnel. As an example of this, conversations with journalists suggest that as a result of computerization, copy editors assume responsibilities once held by others, notably those in back-shop positions. Given the time constraints of publishing the newspaper, the copy editors find it difficult to manage the increased work load and still maintain satisfactory performance levels. The result is the addition of personnel at these positions. In some instances, the distribution of labor may be modified further by the computer's replacing personnel. The resultant shift or variant dispersion of personnel across functional areas raises questions not only concerning future vocational skill requirements, but also concerning the redistribution of organizational power. One might speculate, as DuBick (1978) has, that the proportionate increase or loss of personnel by subunits is an indication of that functional subunit's importance to the organization.

Scharek and Barten (1975) and Whisler (1970) provide some support for these arguments in their findings that implementation of EDP led to the replacement of departments and groups as well as the elimination of a substantial number of lower level positions. The question of interest in the present study is whether these changes result from initial implementation of the computer or whether the computer's integration into the work flow activities as the predominate technology will continue to influence the division of labor. It seems reasonable that initial implementation will result in the addition of technical personnel to service and program the computer or even the loss of clerical personnel whose duties have been automated. However, as the extent of usage and applications across the organization occurs as part of an integrative predominate technology, will distributions of labor continue to change? To explore this question it is proposed that *as the extent of computer utilization increases, the division of labor as reflected by functional diversification, functional specialization, and functional differentiation also will increase.*

The Influence of Organization Size

Many of the early research efforts that examined the influence of technology on organization structure considered technology as the imperative (Woodward, 1965; Zwerman, 1970). This approach has been subsequently challenged by assertions that other contextual variables are more important determinants. Notably, the proponents of organization size (Child, 1973; Hickson, Pugh, & Pheysey, 1969) have made conclusions similar to

Blau et al.'s (1976) that organization size rather than production technology appears to exert the more significant influence on the division of labor and the organization of work. The technology-size debate has been complicated further by indications that size may affect the way in which technology influences the concentration of authority (Blau & Schoenherr, 1971; Blau et al., 1976; Hickson et al., 1969), formalization of rules and procedures (Child, 1973; Samuel & Mannheim, 1970), and the division of labor (Blau et al., 1976). For the present study this presents a more relevant question than the resolution of the size-technology imperative debate—to what extent does size mediate the relationship between increasing computer utilization and the organization's structure? Hickson et al. (1969) argued that the closer technology is to the actual work flow of the organization, the greater its influence on structural characteristics. Thus, technology would have a greater influence in small organizations than in large ones. Extending this line of reasoning leads to the question of whether the level of computer usage in the organization interacts with organization size in explaining the relationship between technology and structure. For example, does the computer's use in production in small organizations have a greater influence on structure than in large organizations? Similarly, does its use in production differ from its use in newsroom or personnel tasks according to size? The findings in the literature indicating size as a moderator have not dealt specifically with the computer as the technology. Thus little guidance is available for formulating specific theoretical propositions. The approach to the size-technology interaction question in this study therefore is exploratory in nature.

Method

Research Setting

For many organizations today—for example, banks, insurance companies, and oil refineries—the possibility that the computer is represented in each of Khandwalla's (1977) work aspects is realized. Although many of these organizations could be used to test the extended conceptualization of the computer, the pervasive integration of the computer in newspaper organizations makes it an ideal industry to study.

The adaptation of computer technology to the newspaper industry began in the printing function, or "back-shop," of newspapers during the early 1960s. What was a labor-intensive process, cumbersome, dirty, time-consuming, and above all costly, became an automated system, cost-efficient in terms of both time and money (Winsbury, 1975).

The technological advancements of the composing/production departments, radical as they were, simply hinted at what was to come. Indeed, the computer was not to be kept in the "back-shop" or in data-processing activities, but it was to permeate the entire newspaper organization and invade even the final bastion—the newsroom. The impetus of this

permeation was the cathode ray tube (CRT) or video display terminal (VDT), whose introduction was typified as "the start of a chain reaction which would revolutionize newspaper production" (Bagdikian, 1971, p. 7). Today's computerized newspaper can aptly be described as a complete interlinking system.

Specifically, in terms of Khandwalla's (1977) definition, the computer controls the work flow process through its control of the task sequence; for example, reporter input to editing, to makeup, to typesetting and printing. Its representation as operations technology is apparent when noting the extent to which the tasks are accomplished through use of the computer: the reporter's inputting stories via video display terminals, the editing of those stories on similar devices, the computerization of typesetting, pagination, printing, addressing, and even routing. Finally, the computer's continued use as information technology is readily seen in its utilization in bookkeeping, accounting, interoffice communications and many other data processing activities. The computer's integration into each of these aspects of technology serves as the justification for contending that for this industry, the computer can be construed as the predominate organizational technology.

Sample

An intracomparative field study was used to gather data from a national sample of daily newspapers. Because size, as well as technology, was a major variable of interest, a stratified random sample of daily newspapers was selected from *Editor & Publisher 1979 Yearbook* (1979). The stratified procedure was chosen rather than a simple random sampling because the size distribution of daily newspapers does not follow a normal distribution. Indeed, there are more than twice as many small newspapers as medium sized and almost four times as many medium sized as large papers. The stratification scheme adopted grouped newspapers as follows: 0-25,000 circulation; 25,001-100,000; over 100,000. Questionnaires were sent to the managing editors of the selected newspapers. Usable questionnaires were returned by 68 organizations, representing a 21 percent return rate. Although the response rate was somewhat low, tests of sample bias indicated that the respondents represented the larger sample. Specifically, published data were available for three key variables. These data were used to perform *t*-tests comparing the nonrespondents and respondents on organization size, (for all three size categories used in stratifying the population), organization age, and number of video display terminals. No significant differences were found. To the extent that these variables can be viewed as representative of other variables in the study, the respondents can be said to represent the sample.

The use of the stratified sampling procedure required that a counterweighting adjustment be made before data analysis to maintain the representativeness of the sample to the population. This weighting was a function

of both the original sampling frame and the rate of response. An advantage of the stratified procedure is that the number of observations in the total sample is allocated among the strata in proportion to the relative number of elements in each stratum of the population. Thus this proportionality must be reflected in the analysis. Furthermore, because the rate of response within each category is rarely equal, this difference also must be accommodated. The absence of sample bias within each size category, as discussed above, adds to the confidence that this counterweighting scheme results in a format that reflects the population.

Means were substituted for missing data on independent variables.

Operationalizing the Extended Conceptualization

Six variables were used to examine the extent of computer usage. Through interviews with practicing managing editors and journalism educators not included in the survey sample, specific tasks were identified that are performed in producing newspapers. The first five measures of computer usage were a listing of these tasks grouped under five headings representing the functional departments wherein the tasks are normally accomplished. The managing editors in the survey were instructed to indicate the extent to which each of the individual tasks is accomplished by using the computer on a 6-point scale ranging from "not at all" to "all the time." The editors also indicated any tasks that were not applicable to their particular production process by marking N/A. To standardize scores, the responses within each category or subunit were summed and then divided by the number of utilization responses. In this way, not only was a measure of the extent of usage possible, but also an assessment of how the computer was being used. Reliability analysis yielded the following alpha values: use in editorial/newsroom, .67; use in advertising/classified, .78; use in production, .62; use in circulation/distribution, .89; and use in administration, .68.

The sixth measure of computer usage was the number of video display terminals or cathode ray tubes within each newspaper. The source for these data was the *Specification Data* (1979) on newspaper production equipment.

Assessing the Concentration of Authority

The inconsistent findings in the locus of decision making literature suggest that the concerns that dictated using multiple measures of technology also were relevant in questioning previous methods of assessing concentration of authority. Grinyer and Yasai-Ardekani (1980) have argued that centralization or decentralization may depend in part on the subject with which the decisions are concerned. As such, they concluded, measures resulting from a summation across various decision subjects, such as those used by the Aston group, may be quite misleading.

Concerned that decision topic may influence the impact of computerization on locus of decision making, key decisions commonly made in the

production of daily newspapers were identified from the literature review and interviews with practicing journalists and journalism educators. The resulting 26 key decisions were grouped into three topic categories: production decisions, news decisions, and personnel decisions. Separate measures then were formulated for each topic area.

Decision making was assessed using a six level organization pyramid (one corresponding to the uppermost level and six to the lowest) originally used by Blau et al. (1976). Managing editors were asked to indicate at which levels within their organization a particular type of decision was made. In the event that decision making was shared equally by two or more levels, instructions were given to circle each level. Grouped under production decisions were 6 decision items; under news decisions, 16 items; and under personnel decisions, 4 items. Examples of the items follow (the complete questionnaire is available from the author):

Production

- Determines pace of production work (work load and necessary number of personnel needed).

News

- Allows emergency changes in deadlines and "extra" editions.
- Determines "play" of major news stories (space, position, photos).

Personnel

- Determines salary ranges for reporting staff.

Decision topic scores were computed by first summing the values associated with the levels involved in a particular decision and dividing by the number of decision items listed within each decision category. In this way, low values corresponded to increasing centralization. Reliability analysis yielded the following alphas: production decisions, .70; personnel decisions, .87; and news decisions, .81.

Although the reliability analysis provides information on the internal consistency of the key informant's perceptions, the use of only one informant per organization precludes assessing the extent of perceptual agreement among respondents within an organization. The extent to which this is a concern may depend on how controversial or debatable the issue being addressed is (Seidler, 1974). Reporting on the addition of personnel or the number of new positions created would hardly qualify as controversial. Some question might be raised, however, concerning the issue of centralization. As a result of instructions included in the questionnaire directing the managing editor to consult other individuals in the organization if necessary, three different groups responded to the questionnaire (albeit for different organizations). These groups represented different hierarchical levels in the organizations: managing editors, editors, and systems personnel. Comparisons of the centralization measures using one-way ANOVA indicated no significant differences among the three groups ($F = .48$ production decisions; $F = .77$ personnel decisions; $F = 1.53$ news decisions). Because the perceptions of decision locus do not appear to vary across hierarchical level, aggregations of respondents within organizations would likely

produce similar results. Perhaps the specific decision questions included in this study were not bias-producing. Thus, the use of a single informant seems acceptable.

Division of Labor

Samuel and Mannheim (1970) distinguished three components of importance in studying the division of labor: (1) functional differentiation; (2) functional diversification; and (3) functional specialization. Functional differentiation refers to the degree to which work is segmented into categories of work or jobs. Thus, one can specify various jobs within organizations and count their total number. The second component, functional diversification, refers to the distribution of personnel across subunits within the organization. Finally, functional specialization is the extent to which the work requires specialized skills versus the extent to which it requires relatively simple skills.

It has been argued that all three of these dimensions are likely to be influenced by extended computerization, but characteristics of the sample chosen indicate that functional specialization may not be as relevant in the present study as are the other two dimensions. Specifically, because orientation and initial training sessions normally are provided to newspaper personnel by hardware suppliers on adoption of the computer system, little differentiation in functional specialization is likely to be discerned. In addition, the uniformly high level of professionalism in newspaper organizations characterized by over 75 percent of the editorial and marketing staffs in prominent daily newspapers being college graduates (Johnstone, Slawski, & Bowman, 1976), along with the established apprenticeship/journeyman programs in production departments, reinforced the notion that functional specialization would not be as discriminating an indicator in newspaper organizations as it would be in other industries. For the present study, then, functional differentiation and diversification were emphasized.

Functional differentiation was assessed by asking respondents whether or not new positions had been created that required writing new job descriptions (yes/no). If responding yes, the respondents were further instructed to provide the new position title and primary responsibilities. The measure of diversification concerned whether or not computerization required additional copy editors (a dummy variable). Rather than being an indication of new positions, this measure is an assessment of adding personnel to currently existing positions, or a measure of concentration.

Size

Researchers recently have expressed concern that size has previously been defined too globally and is more likely a multidimensional construct (Gupta, 1980; Kimberly, 1976). Following this lead, two measures of size were included in the study: the number of full time personnel and the circulation

size of the newspaper. Additionally, several studies have suggested a curvilinear relationship between size and other organizational variables (Child, 1973; Hickson et al., 1969; Indik, 1964). One common way of dealing with these relationships has been the use of log transformations (Kimberly, 1976). Based on these findings and preliminary data analyses using polynomial regressions, the log of each size measure was adopted. Circulation data were obtained from the *Editor & Publisher 1979 Yearbook* (1979). Number of full time personnel was reported by the managing editors.

Analytical Procedures

Moderated regression analysis (Allison, 1977; Arnold, 1982; Peters & Champoux, 1979) was used to test the moderating effects of organizational size on the technology-structure relationships. Moderated regression entails the hierarchical regression of the dependent variable on the independent variable, the moderating variable, and the product of the moderator and independent variables. If the product term contributes to a significant increase in R^2 , an interaction effect has been identified. Significant interactions were examined further using a procedure advanced by Cohen and Cohen (1975). Because the presence of a significant interaction would indicate that the effects of technology were different for some sizes of organizations than others, main effects tests were appropriate only after the interactive tests. If significant interactions were not evident, simple multiple regression analyses were used to test the main effects hypotheses.

Findings

The means and standard deviations along with the zero-order correlation coefficients for measures of technology, size, and the structural variables are displayed in Table 1. Despite any unique explanation that may have been provided by the theoretical differentiation between the size measures, the extremely high correlation between them ($r = .83$) introduces the problem of multicollinearity. The consequence of the collinearity is that if both variables are included in the same simultaneous regression model the coefficients produced may be highly misleading (Cohen & Cohen, 1975). One way of dealing with the problem is to use only one of the variables to represent the common underlying dimension.

In selecting the measure to retain, circulation size was chosen for two reasons. First, the higher correlation coefficient between personnel and number of video display terminals ($r = .73$) again introduced the possibility of multicollinearity, the magnitude of which is lessened by using circulation size ($r = .63$). The second reason was Kimberly's (1976) suggestion that the personnel component is more relevant to the issues of social control, whereas activity volume and physical capacity are more relevant for questions concerning work structure. Thus, circulation size was included in subsequent analyses as the measure of organizational size.

Table 1
Means, Standard Deviations, and Zero-Order Correlations

Variable	1	2	3	4	5	6	7	8	9	10	11	12	Mean	S.D.	N
1. Video display terminals	.28*												28.79	43.49	68
2. Use in administration	.35**	.32**											2.18	1.01	68
3. Use in advertising	.31**	.57***	.25*										2.71	1.51	68
4. Use in circulation	.04	.34**	.31**	.42***									2.82	2.08	68
5. Use in production	.37***	.37***	.47***	.41***	.58***								2.89	1.26	68
6. Use in news room	.24*	.23*	.28*	.27*	-.08	-.15							3.00	1.21	68
7. News decisions	.07	.08	.22*	.02	.10	.07	.16						3.42	.45	61
8. Personnel decisions	.18	.01	.31**	.07	.05	.07	.21	.27*					2.60	.56	67
9. Production decisions	.52***	.36**	.40***	.44***	.02	.24*	.32*	.19	.15				2.48	.54	65
10. New copy editors	.38***	.21*	-.05	.39***	-.19	-.08	.37**	.01	-.08	.42***			.41	.50	61
11. Jobs with new descriptions	.65***	.46***	.48***	.34**	.17	.39***	.36**	.25*	.05	.52***	.38***		9.68	1.13	68
12. Log circulation	.73***	.50***	.38***	.46***	.12	.25*	.40***	.31**	.13	.58***	.49***	.83***	4.30	.16	68

* $p < .05$ ** $p < .01$ *** $p < .001$

Table
Regression Analysis of Technology

<i>Variables Added to the Equation</i>	<i>News Decisions</i>			<i>Personnel Decisions</i>		
	<i>Unstandardized Coefficient</i>	<i>R²</i>	<i>F</i>	<i>Unstandardized Coefficient</i>	<i>R²</i>	<i>F</i>
Step 1:						
Log circulation (size)	.142*	.13	8.80	.122*	.06	4.28
Step 2:						
Log circulation (size)	.113*			.154		
Video display terminals	.001			-.002		
Use in administration	.012			-.017		
Use in advertising	.091*			.058		
Use in circulation	.066*			-.020		
Use in production	-.018			.045		
Use in news room	-.196*			-.042		
		.37	4.49*		.10	.98
Step 3:						
Log circulation (size)	.050			.365		
Video display terminals	.053			.043		
Use in administration	.549			.772		
Use in advertising	-.512			.820		
Use in circulation	.569			-.462		
Use in production	.363			-.441		
Use in news room	-1.566			.069		
Size × video display terminals	-.005*			-.004*		
Size × use in administration	-.060			-.071		
Size × use in advertising	.050			-.084		
Size × use in circulation	-.056*			.040		
Size × use in production	-.034			.047		
Size × use in news room	.142*			-.007		
(Constant)	3.204			-.954		
		.63	6.07**		.35	2.35*

*Unstandardized coefficient twice its standard error.

* $p > .05$

** $p < .01$

Moderated Analyses

Table 2 presents the results of the moderated regression analyses. Tests of R^2 increase revealed that organization size significantly moderated the technology locus of news-decision relationship and the technology locus of personnel-decision relationship. Additionally, size significantly moderated the relationship between technology and two of the division of labor variables: new copy editors (functional diversification) and jobs with new descriptions (functional differentiation). It is noteworthy that across these four analyses the way in which the computer was actually used differentially contributed to the interactions.

The significant interactions were examined further using a procedure advanced by Cohen and Cohen (1975) in which the overall regression equations were broken down to illustrate each technology coefficient in terms of size. Because each equation represents a family of equations, various values of the moderating variable could be substituted into the equations in order to observe changes in the technology coefficients. For illustrative purposes, values of size were arbitrarily chosen to equal one standard deviation

2 and Size on Structure

<i>Production Decisions</i>			<i>New Copy Editors</i>			<i>Jobs with New Descriptions</i>		
<i>Unstandardized Coefficient</i>	<i>R²</i>	<i>F</i>	<i>Unstandardized Coefficient</i>	<i>R²</i>	<i>F</i>	<i>Unstandardized Coefficient</i>	<i>R²</i>	<i>F</i>
.035	.01	.28	.230 ^a	.27	20.74	.167 ^a	.15	9.86
-.105			.140 ^a			.160 ^a		
.003			.001			.002		
-.032			.013			-.020		
.147 ^a			.073			-.064		
.106			.089 ^a			.116 ^a		
.024			-.109 ^a			-.103		
-.063			.004			-.090 ^a		
	.15	1.29		.42	5.24*		.45	6.01**
-.097			-.119			-.054		
.007			.008			.026		
-.056			-.607			-.637		
.122			.937			-.087		
-.139			.610			.766		
.081			-1.294			-.009		
-.084			-.525			-1.386		
-.001			-.001			-.002		
.001			.064			.056		
.001			-.091			-.019		
.001			-.053			-.066 ^a		
-.001			.122 ^a			-.004		
-.001			.062			.136 ^a		
3.117			1.308			1.317		
	.18	.77		.55	4.19**		.58	4.76**

(s.d.) above the mean, at the mean, and one below the mean. These values were substituted into the equations displayed in Figures 1 through 4 providing an illustration of the technology-structure relationship at varying levels of size.

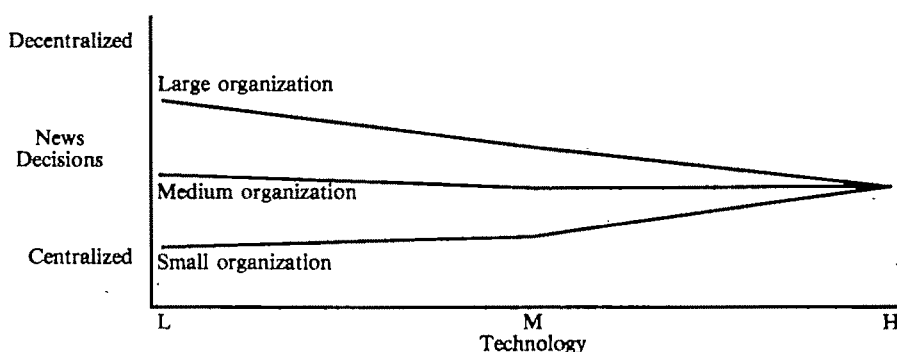
Substituting these values into the equations demonstrates that although the impact of the number of video display terminals and the computer's use in administrative tasks on centralization of news and personnel decisions increases as size increases, the computer's use in the other subunits differentially influences news and personnel decisions. That is, as size increases, use in circulation and production predicts a centralization of news decisions and a decentralization of personnel decisions. Similarly, use in advertising and newsroom tasks predicts a centralization of personnel decisions and a decentralization of news decisions. With the exception of the computer's use in production tasks, the direction of the relationship between computerization and subunit usage is the same for both new copy editors and jobs with new descriptions across all three size categories.

The apparent anomalies in these equations become even more evident when viewed at various levels of technology. For illustrative purposes, values



of technology levels were chosen to represent low, medium, and high levels of usage; one s.d. above the mean, at the mean, and one s.d. below the mean for the USE variables and 6, 24 and 50 for the video display terminals (which represented VDT values at the 20th percentile, the median, and the 80th percentile in the distribution). The results of this procedure are depicted in Figures 1 through 4.

Figure 1
A Graphic Illustration and Regression Equation of
the Interaction for News Decisions^a



^aNews decisions = (.053 - .005 size)VDT + (.549 - .060 size)Useadmin + (-.512 + .050 size)Useadv + (.569 - .056 size)Usecirc + (.363 - .034 size)Useprod + (-1.566 + .142 size)Usenwsrm + (3.204 + .050 size). VDT = video display terminals; Useadmin = use in administration; Useadv = use in advertising; Usecirc = use in circulation; Useprod = use in production; Usenwsrm = use in newsroom.

The trend toward centralization of news decisions in large and medium sized organizations as graphed in Figure 1 supports previous research by Whisler (1970) but contradicts portions of the Aston group's research (Hickson et al., 1969). Hickson et al. (1969) contended that in cases in which technology is least integrated, authority tends to be concentrated at the apex in boards or with the chief executive and, furthermore, that technological integration refers explicitly to work flow activities. Given the nature of the work process in newspaper organizations, news decisions clearly are a central part of the daily work flow activities and thus, according to the Aston group, should be centralized when the level of computer usage is low. Instead, the findings illustrated in Figure 1 for large and medium sized organizations support Whisler's contention that increasing computer usage, particularly in circulation and newsroom tasks, and increasing the number of video display terminals provides the means for processing large amounts of data and information such that a small number of persons can effectively control the news decision making process. In small organizations, however, Figure 1 indicates that increased usage facilitates a decentralization trend.

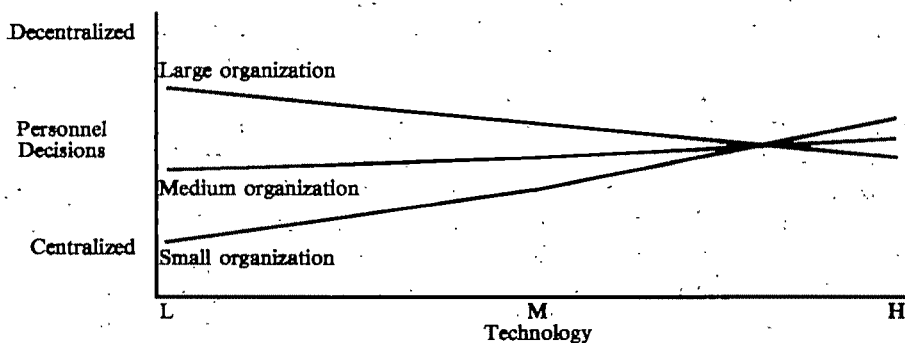
One explanation for this conforms to the Hickson et al. (1969) finding that the structure of small organizations would be influenced by technology

to a greater extent (and, thus, decision making decentralized) because the components of small organizations are much more apt to be closely involved with the work flow processes. A second explanation may be that increasing computer utilization in small organizations is reacted to by segmenting or specializing decision making functions. Managers at the upper levels of the organization respond to the potential of increased access via video display terminals by actualizing the control potential of the system. In small organizations, where utilization is even greater, economies of scale may prevail such that those at the top relinquish decision control and it becomes more decentralized.

Another way of viewing these findings is within the context of uncertainty reduction. Pfeffer (1978) suggested that the reduction of uncertainty occurs through the control of information from a central position in the organizational communication network. For large organizations, and to a lesser extent medium sized ones, management is more removed from the day-to-day work process. In such instances, the computer may act as the control mechanism providing these decision makers the means of keeping their fingers on the "pulse" of the work, thus reducing uncertainty. In small organizations, whose personnel are a more active part of the work process, their proximity may supplant that advantage of the computer.

An examination of Figure 2, in which personnel decisions is the dependent variable, reveals only partial support for the previous finding that increased automation or computerization promotes decentralization of decision making, particularly hiring decisions (Klatzky, 1970). The graph indicates that this trend is supported in small and medium sized organizations, but the opposite is evident in large organizations. This suggests that certain aspects or capabilities of the computer, which would lead to a centralization

Figure 2
A Graphic Illustration and Regression Equation of
the Interaction for Personnel Decisions^a

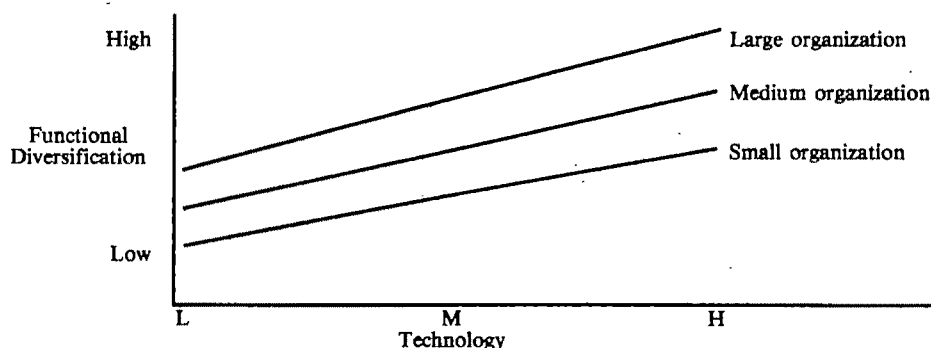


^aPersonnel decisions = (.043 - .004 size)VDT + (.772 - .071 size)Useadmin + (.820 - .084 size)Useadv + (-.462 + .040 size)Usecirc + (-.441 + .047 size)Useprod + (.069 - .007 size)Usenwrm + (-.954 + .365 size). VDT = video display terminals; Useadmin = use in administration; Useadv = use in advertising; Usecirc = use in circulation; Useprod = use in production; Usenwrm = use in newsroom.

of personnel decisions, prove more advantageous for large organizations. This capability is quite likely the informational capacity of the computer as it concerns personnel matters, which is facilitated by the number of video display terminals. Not only would the increased specialization of skills in large organizations require more voluminous records regarding specific job requirements, but also large organizations are apt to be more susceptible to federal regulations concerning labor laws, discrimination, and pension programs that would require more detailed record keeping. As the number of video display terminals increases, facilitating this record keeping process, decisions regarding personnel matters in large organizations are apt to become increasingly centralized into the hands of a few. Hence, rather than relinquishing control of personnel decisions to many parts of the organization as size increases, the access represented by the remote terminals allows centralized control and coordination.

Figure 3 provides graphic illustration of the technology-size interaction with functional diversification (new copy editors) as the dependent variable. The graph indicates that for all sized organizations, at higher levels of computer utilization the addition of new copy editors is more pronounced. This trend, however, is more pronounced in large than in medium or small organizations. A review of Table 2 suggests that the differentiating factor in this interaction involves the computer's use in production tasks. This supports the initial assumption made in hypothesizing the main effect relationship between computerization and functional diversification. The rationale underlying the hypothesis was that as a result of computerization, responsibilities once held by others (in particular those in "back-shop" production tasks) would shift to others, notably copy editors. In turn, in order to maintain satisfactory performance levels, additional copy editors would

Figure 3
A Graphic Illustration and Regression Equation of
the Interaction for Functional Diversification^a

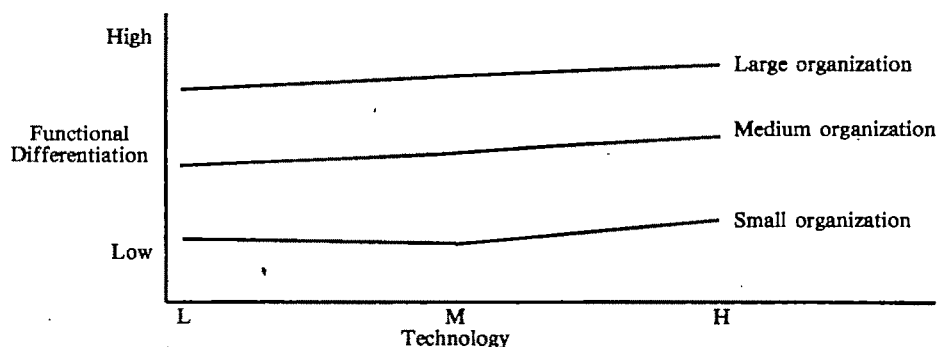


^aFunctional diversification = (.008 - .001 size)VDT + (-.607 + .064 size)Useadmin + (.937 - .091 size)Useadv + (.610 - .053 size)Usecirc + (-1.294 + .122 size)Useprod + (-.525 + .062 size)Usenwsrm + (1.308 - .119 size). VDT = video display terminals; Useadmin = use in administration; Useadv = use in advertising; Usecirc = use in circulation; Useprod = use in production; Usenwsrm = use in newsroom.

become necessary. The trend graphed in Figure 3 provides support for this assumption. The graph indicates that at higher levels of computer utilization, the number of new copy editors predicted is also greater. The slope for small organizations, at low and medium levels of usage, may indicate that transferred responsibilities are shared by several positions rather than concentrated at the copy editor position. This interpretation is consistent with the practice of people in small organizations often wearing several hats, and thus personnel performing these duties are likely not identified as copy editors per se.

Figure 4 displays the technology-size interaction with functional differentiation (jobs with new descriptions) as the dependent variable. The graph indicates that as computer utilization increases, the number of jobs with new job descriptions increases across all three size categories. This increase is most pronounced in small and medium sized organizations. The significance of this finding is clarified by examining precisely what is meant by the term "jobs with new descriptions." Survey respondents who indicated that new positions had been created in their newspapers since installation of the computer were further asked to list the new position titles and the primary responsibilities. As predicted, implementation of the computer resulted in new editor positions (i.e., News Systems Editors, Copy Editor, News Editor, Copy Desk Supervisor, and Advance Editor), but the majority of the titles indicated that the new positions were in response to the mechanical aspects of computerization (i.e., D.P. Manager, Computer Operator, Technical Service Operator, Systems Manager, etc.). The slopes for small and medium sized organizations suggest that the addition of these positions is proportionately greater at medium and high levels of usage. For large organizations, the addition is a more gradual increase across the

Figure 4
A Graphic Illustration and Regression Equation of
the Interaction for Functional Differentiation^a



^aFunctional differentiation = (.026 - .002 size)VDT + (-.637 + .056 size)Useadmin + (-.087 - .019 size)Useadv + (.766 - .066 size)Usecirc + (-.009 - .004 size)Useprod + (-1.386 + .136 size)Usenwsrm + (1.317 - .054 size). VDT = video display terminals; Useadmin = use in administration; Useadv = use in advertising; Usecirc = use in circulation; Useprod = use in production; Usenwsrm = use in newsroom.

three levels of usage. One interpretation of this interaction is that for large organizations the addition of new positions may depend not so much on the extent of utilization but on the implementation or adoption of the system itself. Small and medium sized organizations, conversely, delay adding these technical positions until the extent of utilization is more pronounced.

Main Effects Tests

To assess the influence of the computer on the dependent variable for which size was found not to moderate the technology-structure relationship, the measure was regressed on the six technology measures as well as organizational size. The results of this simple multiple regression are presented in Table 2 corresponding to step two.

Only minimal support was provided for the hypothesis that as computer utilization increases, the locus of decision authority will become centralized in the organization. The computer's use in advertising tasks ($\beta = .147$) was the only technology variable to predict significantly the locus of production decision. A comparison of the findings from this analysis with those concerning locus of news and personnel decisions reveals that whereas organizational size had a major impact on the other decision making measures, in the form of moderating the technology-structure relationship, size had no significant effect on the locus of production decisions.

Conclusions

The intention of this study was to assess whether the modal structure of an organization is influenced by computerization: (1) when the computer is viewed as the organization's predominate technology with the potential for affecting the entire work flow process; (2) when multiple measures operationalized as unit indices capable of assessing the extent and type of computer applications were used; and (3) when a sample was selected in which the computer represented various forms of technology as well as varying degrees of utilization. The findings suggest mixed success.

Although the relative impact of computer technology on the locus of decision-making and division of labor dimensions was shown to be directly related to specific tasks for which the computer is used, results of the data analyses also revealed that size of the organization moderated the technology-structure relationships. Furthermore, the way in which size influenced each of these variables was not the same.

Specifically, of the three locus of decision variables considered, size moderated the technology-news and technology-personnel decision relationships. Whereas the number of video displays was the only technology variable that appreciably contributed to the locus of personnel decision relationships, use in circulation and newsroom tasks also influenced the locus of news decisions. Neither size nor technology had a significant influence on the locus of production decisions. Size moderated the influence of technology

on both of the division of labor variables considered: the addition of new copy editors and the number of jobs with new descriptions. Whereas use in circulation and use in newsroom tasks were the major contributors to the technology-size influence on jobs with new descriptions, use in production was the greatest influence on the number of new copy editors. The inconsistencies of these findings suggest that the use of multiple indicators for both technology and the locus of decisions was useful in isolating influences that may have been masked in global measures. However, the differential relationships provoke the need for further investigation and explanation.

First, the finding that locus of decision making is predicted by differing unit technology measures rather than by personnel decisions suggests that the continuation of Grinyer and Yasai-Ardekani's (1980) work on identifying dimensions of decisions is warranted in future research. In addition to specifying domain topic, it may prove useful to distinguish strategic from tactical decisions within the topical areas.

Second, the differential influence of the computer applications across the dependent variables raises the question of whether some aspects of the work process are more amenable to being "programmed" by the computer than others. The key concern in determining work processes or decisions that can be programmed depends on the degree of routinization possible (March & Simon, 1958). In turn, the degree of routinization relies on the task environment (Perrow, 1970). The greater the uncertainty in the task environment, the less routinization possible. The question then becomes, for which tasks does the computer facilitate processing, coding, and formatting environmental information such that uncertainty is absorbed and programmed activities or decisions are possible?

For the present study it seems plausible that decisions regarding printing requirements, paste-up specifications, and typesetting criteria involve less uncertainty and, in turn, are more programmable than are activities and tasks for which news and personnel decisions are required. Thus, the computer's use in production activities can be said to facilitate uncertainty reduction to a greater extent than can its use in newsroom or administrative tasks.

The implication of this explanation is that the structure of the organization may depend not only on the degree and type of computer applications but also on the extent to which the computer facilitates uncertainty absorption. Robey's (1977) assertion that under stable task environment conditions, computers tend to reinforce centralization, but under dynamic conditions decentralization is facilitated, supports this contention.

Finally, attention needs to be focused on the level in the organization at which specific tasks are performed. For example, in the present study the computer's use in administrative tasks (representing work processes at the upper levels of the organization) had little influence on the dependent variables. Its use in those activities that represented the mid or lower levels, however, had predominate and differential influence. To what extent this

indicates that some applications influence the modal structure and others have more relevance at the subunit level is still open to question. In small organizations, in which hierarchical levels are compressed and each is respectively closer to the primary work process, it seems reasonable to suppose that the applications of the computer will more pervasively influence the overall structure. In medium and large organizations one would expect the work process to be more differentiated. Economies of scale derived from the computer usage then likely would be more specific for the subsystem housing the application.

Banbury and Nahapiet (1979) began this investigation in their distinction between automated and craft-based primary subtasks. In automated subtasks, they contended, control decisions contain zero uncertainty and hence are completely programmable. For craft-based subtasks, however, the actions cannot be specified and therefore the control decisions are non-programmable. In addition, they have suggested that although organization size will influence some subsets of an organization more than others, size is least likely to influence the subtask level in which there is moment-by-moment control. Instead, this level, which they refer to as the "engineering criteria," is more likely to be influenced by technology. The present study is a step forward, but future research must be increasingly sensitive not only to the operationalization of contextual variables, but also to the extent and manner in which the computer is used and the programmability of the tasks to which its utilization is applied.

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Decision Makers' Beliefs About the Causes and Effects of Structure: An Exploratory Study¹

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In a study of decision maker beliefs about the causes and effects of structure, a high level of agreement was found between the cognitive maps of a group of MBAs and a group of full time practicing managers concerning the overall causality of context, structure, and performance variables.

A central question in the study of organizations is, Why do organizations have different structures? One perspective on this question, the structure-contingency perspective (Pennings, 1975), holds that the structure of an organization is dependent on its context. That is, organization structure is a variable whose value is contingent on the setting in which the organization is located such that differences in contexts produce differences in structure. In this regard, research has shown that variation in organization structure can be explained by variations in such context factors as size, technology, and environmental uncertainty (Ford & Slocum, 1977). Because the structure-contingency perspective holds that organization performance is a function of the appropriateness and tightness of the "fit" or alignment between context and structure, the motivation for the linkage between context and structure is that of performance (Lawrence & Lorsch, 1967; Thompson, 1967). Accordingly, understanding an organization's structure requires understanding and knowing (Weick, 1979) the organization's context and the uncertainty that context generates.

A criticism of the structure-contingency perspective is that it is essentially a direct stimulus-response model (context is the stimulus and structure

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is the response) that fails to take into consideration those who have the power to direct organizations (Bobbitt & Ford, 1980; Boulding, 1956; Child, 1972; Galbraith, 1977). Although it identifies situational factors that are likely to influence structure, and alignments between context and structure that are associated with different levels of performance, the structure-contingency perspective does not explain the process(es) or mechanism(s) through which these factors are translated into structure or better performing alignments evolve (Miles, 1982). Rather, rational processes for the linkages are inferred post hoc (Benson, 1977).

In response to this criticism, several writers have advocated the inclusion of decision maker choice as a determinant of structure (Bobbitt & Ford, 1980; Child, 1972; Galbraith, 1977; Montanari, 1978). Bobbitt and Ford (1980), for example, argue that structure is the consequence of a decision problem that is influenced by the cognitive and motivational orientations of the decision maker(s). Cognitive orientation refers to the "systems for the organization of information, observation and thought in the process of individual and group problem-solving," and motivational orientation refers to the "systems for the organization of values and evaluation in the process of individual and group problem-solving" (Solo, 1967, p. 361).

One characteristic of decision makers that involves both cognitive and motivational orientations, and thus may be particularly significant as a source of influence in decisions pertaining to structure, is decision maker beliefs about the causes and effects of structure (Beyer, 1981; Bobbitt & Ford, 1980; Boulding, 1956). On the one hand, such beliefs act as filters on how decision makers see the world by serving to explain the how's and why's of events (i.e., cognitive orientation). Beliefs rationalize a decision maker's understanding of the world and influence perceptions by focusing attention on particular events and providing an interpretation for those events (Beyer, 1981). Such focusing and interpretation, however, may lead to incorrect attributions and inappropriate actions. Research on organization failure and crises, for example, has shown that managerial beliefs about cause and effect are instrumental in these occurrences (e.g., Hedberg, Nyström, & Starbuck, 1976). Therefore, decision maker beliefs about cause and effect may result in causality being attributed to the wrong contextual factor(s) or to a misinterpretation of how a contextual factor has changed and its subsequent implications for structure.

On the other hand, beliefs about the causes and effects of structure also influence action (i.e., motivation orientation). Haberstroh and Gerwin (1972), in their model of strategic decision making, indicate that beliefs are pervasive in the decision making process, influencing perceptions as well as strategic choices. Sproull (1981) indicates that beliefs about work processes and technologies, organization identity, and environmental characteristics all influence the actions that occur in organizations by serving as guides for future action and justification for past actions. Similarly, the research on values indicates that decision maker values influence decision maker choices (England, 1967; Hegarty & Sims, 1978). Therefore, not only

will beliefs influence how, if at all, contextual factors are viewed, they also will influence how decision makers may cope.

In summary, the decision maker choice perspective holds that structure is the consequence of decision maker choice that may or may not take into account the organization's contextual situation. Rather than assume the direct and rational linkages between context and structure implicit in the structure-contingency perspective, the decision maker choice perspective holds that the linkage between context and structure is through decision makers. Consequently, it is the characteristics of the decision maker(s) and the decision making process that determine the relationship between context and structure. To understand this relationship it is necessary to understand decision maker beliefs.

In light of these considerations, this paper examines decision makers' beliefs about the causes and effects of structure. More specifically, this study examines the extent to which decision makers' beliefs about the causes and effects of structure correspond to the context → structure → performance (where → implies causality) perspective evidenced in current organization theory literature. To determine decision maker beliefs about the causes and effects of structure, the technique of cognitive mapping (Axelrod, 1976), also referred to as influence diagrams (Diffenbach, 1982; Hall, 1978; Roos & Hall, 1980) was used.

Cognitive mapping has been used extensively in the areas of foreign policy analysis and environmental psychology, but it has been virtually ignored in organization theory (see Bougon, Weick, and Binkhorst, 1977; Hall, 1978; and Roos and Hall, 1980, for exceptions). In essence, cognitive mapping, as used here, is a method by which a researcher can graphically represent, in a manner analogous to a path analysis diagram, an individual respondent's assertion of causality among a set of variables. As Axelrod indicates:

A cognitive map is a specific way of representing a person's assertions about some limited domain such as a policy problem. It is designed to capture the structure of the person's causal assertions and to generate the consequences that follow from this structure (1976, p. 55).

Cognitive mapping, therefore, looks at the pattern or structure of assertions of causality among variables and not at how or why variables or their causal relations come to be part of the map. Cognitive maps have been shown to be relatively stable and thus capable of providing the basis for prediction (Bonham & Shapiro, 1976).

Although analogous to a path diagram, cognitive mapping is different in that the respondent, rather than the researcher, generates the map or path diagram. This is done by giving the respondent a set of variables (called points) and asking him/her to identify the nature of the cause/effect relations, if any, that exist among each combination of variables. Variables are used because they may take on a range of values for each respondent although the actual values are not specified. Assertions of causality among variables are represented by arrows (from cause to effect), which may take on values of -1 (negative causality relation), 0 (no causality relation), or +1 (positive causality relation).

The concern in this paper is determining the structure of decision makers' cognitive maps concerning causality relations among variables of context, organization structure, and performance.

Data and Method

Variables

The set of eight variables included in this study were derived by the researchers from the current literature on organization context and structure. To establish a cognitive map, a respondent must specify the nature of the causality relation that exists between *each combination* of variables being considered. This means that a total of $n(n - 1)$ comparisons must be made, where n is the number of variables. Because the inclusion of a large number of variables requires a considerable amount of a respondent's time, and because this is an exploratory study, it was decided that only some of the more salient (as evidenced in the literature) context and structure variables should be included.

Accordingly, context dimensions associated with technology and people were included, as well as the structural dimensions of formalization, complexity, and centralization (Ford & Slocum, 1977). In addition, a performance dimension was included because cognitive maps generally have as the ultimate dependent variable some form of utility (Axelrod, 1976). Even by restricting the number of variables, however, it still took respondents more than an hour to complete their respective maps.

Technology. The empirical and theoretical literature on technology is extensive and conflicting. In their review of the literature, however, Ford and Slocum (1977) indicate that task variability or routineness is one dimension that seems to underlie most perspectives on technology. Therefore, the variable of *task variability* was included through the phrase "degree of variability in tasks performed."

An aspect of technology not covered by task variability, but which has been argued to be a significant correlate of structure, is interdependence (Galbraith, 1977; Thompson, 1967; Van de Ven, Delbecq, & Koenig, 1976). Interdependence refers to the extent to which individuals must interact to perform their task. *Interdependence* was included here by the phrase "degree of interdependence among those involved in performing tasks."

People. A second contextual dimension that has been shown to influence structure is that associated with people. The number of people (i.e., size), for example, has been shown to be a significant correlate of organization structure (Ford & Slocum, 1977). For this reason, *size* was included: "number of people involved in performing tasks."

In addition to quantity, the quality of people also is seen as an influencing factor on structure. The literature on professionalism, for example, indicates that the qualitative aspects of people influence structure (Filley,

House, & Kerr, 1976). *Personnel competence* was included: "level of competence of people performing tasks."

Structure. The three primary dimensions of structure identified in the literature are complexity, formalization, and centralization (Ford & Slocum, 1977). Complexity refers to the extent to which work is divided either vertically or horizontally. It was included here as the *division of work* by the phrase "degree to which work is divided among those performing tasks."

Formalization refers to the use of written rules and procedures and it was also included: "extent to which rules, policies, and procedures are used."

Finally, centralization refers to the locus of decision making authority. *Delegation* was used as an indicator of centralization: "extent to which decision making authority is delegated to those performing the tasks."

Performance. Work is organized to achieve some outcome utility. As such, structure serves as a means to an end. Although there are a variety of outcomes that may be pursued, one is that of work quality (Hage, 1980). Therefore, *quality* was included: "the quality of work performance obtained." Quality was chosen over the others suggested by Hage because of increasing popular attention to the quality of American work.

Sample

There were two groups in this study. The first was a class of graduating full time MBAs enrolled in a course in Business Policy at a large midwestern university. Each of the MBAs had completed a required course in which structure-contingency perspectives were covered and which was a prerequisite to the policy course. Thus it was felt that they would be more likely than other samples to have cognitive mappings that reflected a structure-contingency perspective. A total of 55 students participated; of these, 50 had usable and complete responses.

As a method of cross validating the results, a group of full time practicing managers enrolled in their first course in a part time MBA program at the same university was used. These managers had not been formally exposed to structure-contingency thinking, at least not in the MBA program, and it was felt that their cognitive maps would be likely to provide an alternative set of relationships among the variables. This feeling was reinforced further when it was found that 70 percent of the respondents in this group had nonbusiness undergraduate backgrounds. It also was felt that because these managers came from a variety of organizations (over 20), their cognitive maps would not be the result of socialization to a single company's beliefs about the causes and effects of structure. Thus, they would provide a more "real world" examination of the causality relations among context, structure, and performance. Of the 40 managers participating, 33 provided complete and usable responses.

Data Collection

Respondents were introduced to the study during one of their regularly scheduled classes. They were informed that this was a study concerning

how decision makers view problems and that the results would serve as the basis for a subsequent class. Respondents then were presented with the upper triangle of an $n \times n$ matrix in which the columns and rows were labeled with the statements of the eight variables. For each pair of variables, the respondent was asked to specify if there was a causal relation (scored as a 1) and, if so, whether the row variable or the column variable was causal by inserting an A (row variable) or B (column variable) in the cell. Respondents were instructed that if they considered the variables to have reciprocal influences, they were to indicate which one they felt had the more dominant causal influence. This process eliminates the occurrence of direct reciprocal causality wherein a variable is both a *direct* cause and effect of second variable. It does not, however, eliminate indirect reciprocal causality in which a variable influences itself through a third variable (e.g., $A \rightarrow B$, $B \rightarrow C$, $C \rightarrow A$).

Once each respondent had identified the existence of causality relations, he/she was asked to indicate the direction of the relation. If an increase (decrease) in one variable produced a decrease (increase) in the other, a negative sign was indicated. If an increase (decrease) in one variable produced an increase (decrease) in the other, a positive sign was indicated. Thus, when a respondent finished, each cell in the upper triangle of the matrix would have one of five values ($A+$, $A-$, $B+$, $B-$, 0). From these, the researchers were able to create a complete $n \times n$ adjacency matrix for each respondent with a -1 , 0, or $+1$ in each cell. An *adjacency matrix* is the matrix of direct effects among the variables comprising a cognitive map where the ij entry indicates the existence and direction of a direct causality relation from variable i to variable j (Axelrod, 1976; Harary, Norman, & Cartwright, 1965). However, in this adjacency matrix there are not direct reciprocal causality relations (a variable is not both the direct cause *and* effect of a second variable).

To assure that respondents understood what was to be done, an example was provided and worked through prior to their beginning. During this time, questions concerning the method were answered. Once all questions had been answered, respondents were instructed to begin.

After completing the identification of causality relations, respondents were asked to indicate, in order of certainty, six relations (approximately 10 percent of the relations) of which they were certain and then to explain, in written form, their rationale for the causality relation. The researchers felt that this would provide additional insight into the cognitive maps, particularly in those cases in which there might be low agreement among respondents as to the nature of the causality relation. All respondents providing usable maps identified and explained six relations.

Results

Comparing the cognitive maps of the MBA and manager groups requires that a single adjacency matrix be developed for each group. This is done

by combining (aggregating) the adjacency matrices of all respondents in the respective groups (Axelrod, 1976; Bougon et al., 1977). The assumption underlying this aggregation is that each respondent is reporting on the same phenomenon and that differences are attributable to a wide variety of randomly distributed factors. Therefore, aggregation provides a more accurate description of the underlying phenomenon than does the adjacency matrix of any single respondent (Axelrod, 1976; Bougon et al., 1977). At the same time, however, it must be recognized that the aggregate adjacency matrix may not accurately reflect the adjacency matrix of any single respondent and that inferences from the aggregate adjacency matrix to individual respondents, therefore, must be made with caution.

When combining adjacency matrices, a criterion must be established for deciding what value will be entered in each cell of the aggregated adjacency matrix. One criterion that has been used is that of majority rule (Roberts, 1976) or voting wherein the nature of the causality relation (positive, negative, zero) most frequently mentioned, or mentioned some prespecified percent of the time, is used. For example, if a relation is seen as positive in 60 percent of the individual respondents' adjacency matrices, as negative in 30 percent, and as zero in 10 percent, the causality relation is treated as positive in the aggregated adjacency matrix.

A problem with the "voting" method, however, is that it ignores the level of disagreement that may exist regarding a causality relation and thus loses valuable information. For this reason, the researchers elected to use the arithmetic mean of the causality relations as the cell entries in the aggregated adjacency matrix (Bougon et al., 1977). As the cell mean approaches -1 or $+1$, it indicates that the vast majority of respondents see the same causality relation. As the mean approaches 0, however, it indicates that either there is equal disagreement over the nature of the causality relation (same number see it as negative as see it as positive) or high levels of agreement that no relation exists. Therefore, if the cell mean approaches 0, it is necessary to know the percentage of respondents who identified a nonzero relation. If there are few nonzero relations, the mean of 0 shows high agreement that no relation exists. If there are many nonzero relations, however, the mean of 0 shows equal disagreement. The cell means and percentage of nonzero relations in the aggregated adjacency matrix for each group is shown in Table 1. (Percentages of nonzero relations are shown in parentheses.)

Direct Causality Relations

The percent of nonzero causality relations shown in Table 1 serves two purposes in understanding the cognitive maps studied here. First, summing the percent of nonzero causality relations in row i gives the *generalized out-degrees* of variable i (Bougon et al., 1977; Nozicka, Bonham, & Shapiro, 1976). Generalized outdegrees serve as an indicator of the extent to which a variable is seen as the *direct cause* of other variables. The higher the

Table 1
Aggregated Adjacency Matrix
Generalized Outdegrees and Indegrees for MBA and Manager Groups^a

Variables	A	B	C	D	E	F	G	H	Generalized Outdegrees
<i>Technology</i>									
A. Task variability									
MBA	—	.06 (.66)	.54 (.58)	.08 (.32)	-.76 (1.00)	.34 (.82)	.18 (.66)	.28 (.72)	4.76
MGR	—	.42 (.61)	.12 (.18)	.09 (.21)	-.24 (.73)	.21 (.51)	.30 (.61)	-.03 (.58)	3.43
B. Interdependence									
MBA	-.12 (.28)	—	.00 (.12)	.00 (.20)	.18 (.66)	-.10 (.46)	.20 (.28)	.20 (.72)	2.72
MGR	-.18 (.30)	—	-.03 (.09)	.06 (.12)	.12 (.42)	.00 (.36)	.12 (.30)	.36 (.79)	2.38
<i>People</i>									
C. Size									
MBA	-.04 (.32)	.18 (.82)	—	-.08 (.16)	.98 (.98)	-.08 (.84)	.74 (.82)	-.52 (.72)	4.66
MGR	.30 (.73)	-.27 (.88)	—	-.18 (.24)	.85 (.91)	-.27 (.76)	.76 (.88)	-.27 (.82)	5.22
D. Competence									
MBA	.30 (.50)	-.18 (.46)	-.48 (.60)	—	-.82 (.86)	.88 (.96)	-.02 (.82)	.94 (.98)	5.18
MGR	.49 (.61)	-.12 (.79)	-.52 (.58)	—	-.58 (.76)	.79 (.85)	.30 (.73)	1.00 (1.00)	5.32
<i>Structure</i>									
E. Formalization									
MBA	.00 (.00)	.08 (.28)	-.02 (.02)	-.04 (.08)	—	-.18 (.42)	.30 (.34)	.24 (.60)	1.74
MGR	-.21 (.27)	-.03 (.09)	.03 (.09)	-.03 (.03)	—	.03 (.39)	.21 (.33)	.36 (.48)	1.68
F. Delegation									
MBA	.16 (.16)	.22 (.46)	-.06 (.14)	.04 (.04)	-.02 (.54)	—	.20 (.44)	.62 (.74)	2.52
MGR	.21 (.39)	.33 (.51)	.00 (.12)	.15 (.15)	-.27 (.51)	—	.12 (.30)	.67 (.79)	2.77
G. Division of work									
MBA	.12 (.28)	.36 (.52)	.14 (.18)	.02 (.10)	.42 (.54)	.04 (.40)	—	.20 (.64)	2.66
MGR	-.06 (.30)	.36 (.61)	.12 (.12)	.06 (.12)	.49 (.55)	.09 (.51)	—	.15 (.76)	2.97
<i>Performance</i>									
H. Quality									
MBA	.04 (.04)	.04 (.08)	.00 (.08)	.02 (.02)	-.02 (.22)	.14 (.14)	.02 (.10)	—	.68
MGR	-.03 (.15)	.00 (.06)	-.03 (.03)	.00 (.00)	-.03 (.27)	.12 (.18)	-.03 (.03)	—	.72
Generalized Indegrees									
MBA	1.58	3.28	1.72	.92	4.80	4.04	3.46	5.12	
MGR	2.75	3.55	1.21	.87	4.15	3.56	3.18	5.22	

^aTop line in each row is MBA, bottom line is managers. Numbers in parentheses are percentage of nonzero relations, other numbers are means.

generalized outdegree, the greater the direct causality attributed to the variable. (The maximum generalized outdegree for any variable is $n - 1$ where n is the number of variables.) In this respect generalized outdegrees can be used to indicate the relative position of a variable in a sequence or flow of causality (Bougon et al., 1977).

In Table 1, computation of generalized outdegrees indicates that MBAs see personnel competence as the variable with the most direct causality (generalized outdegree is 5.18), followed by task variability (4.76), size (4.66), interdependence (2.72), division of work (2.66), delegation (2.52), formalization (1.74), and quality of performance (.68). Managers also see personnel competence as the variable with the most direct causality (generalized outdegree is 5.32) followed by size (5.22), task variability (3.43), division of work (2.97), delegation (2.77), interdependence (2.38), formalization (1.68), and quality of performance (.72). Comparison of the rank ordering of the generalized outdegrees for MBAs and managers indicates a very high level of agreement between the two groups (Spearman $r_s = .99$, $p \leq .01$) as to the order of variable causality.

Second, summing the percent of nonzero relations in column j gives the *generalized indegrees* of variable j (Bougon et al., 1977; Nozicka et al., 1976). Generalized indegrees serve as an indicator of the extent to which a variable is seen as *directly influenced* by other variables. The higher the generalized indegree, the more the variable is directly influenced by other variables. (The maximum generalized indegree for any variable is $n - 1$.) As with generalized outdegrees, generalized indegrees can be used to indicate the relative position of a variable in a sequence or flow of causality (Bougon et al., 1977).

The generalized indegrees in Table 1 indicate that MBAs see quality of performance as the most directly influenced variable (generalized indegree is 5.12) followed by formalization (4.80), delegation (4.04), division of work (3.46), interdependence (3.28), size (1.72), task variability (1.58), and personnel competence (.92). Similarly, managers see quality of performance as the most directly influenced variable (generalized indegree is 5.22), followed by formalization (4.15), delegation (3.56), interdependence (3.55), division of work (3.18), task variability (2.75), size (1.21), and personnel competence (.87). Comparison of the rank ordering of generalized indegrees also indicates a substantial agreement between MBAs and managers (Spearman $r_s = .99$, $p \leq .01$).

The high level of agreement between MBAs and managers with respect to generalized outdegrees and indegrees indicates a high degree of similarity between their respective maps. This similarity is supported further by the significant rank order correlation ($r_s = .66$, $p \leq .001$) of the 56 cell means in the aggregate adjacency matrix shown in Table 1. This indicates that the structures of the respective maps are very similar.

Although the generalized outdegrees and indegrees provide information concerning the overall extent to which a variable is seen as directly influencing or being directly influenced by other variables, they do not provide

information about specific direct cause-effect relations. To obtain this it is necessary to examine individually each cell in the aggregate adjacency matrix. When examining each cell, the central focus is on the extent to which respondents agree that a given type of direct causality relation exists and the extent to which that agreement supports current structure-contingency literature.

Agreement in this case is of two forms. The first is the extent to which respondents agree that a nonzero causality relation exists. For purposes here, agreement is said to be high if 70 percent or more of the respondents saw a zero relation or if 70 percent or more saw a nonzero relation (70 percent was selected because it separates the upper third when data are trichotomized into equal thirds). For example, in row A and column E (cell AE; to facilitate discussion, subsequent references will refer to cells in which the first letter designates the row and the second the column) of Table 1 there is high agreement among both managers and MBAs that task variability has a nonzero causality relation to formalization. Similarly, in cell AD, there is high agreement that task variability has a zero causality relation to personnel competence. In cell FB, however, there is a lack of agreement as to the direction of causality of delegation on interdependence.

Where there is high agreement that a causality relation is nonzero, there is the question of the level of agreement as to whether the relation is positive or negative. Defined as high agreement are those situations in which the ratio of the mean to the percent of nonzero causality relations was .70 or greater. The closer the ratio is to 1, the greater the level of agreement among respondents as to whether the relation is positive or negative. This ratio is used to examine the degree of agreement within groups regarding the direction (+ or -) of a causality relation.

People and Structure. The research on size and structure suggests that as size (number of people) increases, delegation, formalization, and the division of work also will increase (Ford & Slocum, 1977). The results in Table 1 indicate that the majority of respondents in both groups see increases in size as causing direct increases in formalization (cell CE) and the division of work (cell CG). This is indicated by both the high means and the percent of nonzero causality relations. There is considerably less agreement, however, as to the direction of influence of size on delegation (cell CF). The low means (-.08 for MBAs and -.27 for managers) and high nonzero causality relations (.84 and .76, respectively) indicate that although decision makers agree that size (number of people) influences delegation, they do not agree on whether that influence is positive or negative.

To understand why the relationship between size and delegation was mixed, the researchers examined the written rationales of those respondents who had identified this as one of the six relationships of which they were most certain. Unfortunately, only three respondents identified this as one of the six relationships of which they were most certain and all saw it the same—positive. The rationale offered by each was that authority should be delegated “due to control problems.”

Agreement as to the influence of size on the quality of work performance (cell CH) is also mixed. Again, there is high agreement that size influences quality (high number of nonzero relations), but relatively low agreement as to whether the influence is positive or negative. The level of agreement is lower among managers than MBAs. Examination of written rationales indicated that some managers and MBAs felt that quality would improve because there would be more people with more ideas and thus a wider variety of choices. Others, however, felt that quality would suffer because the increased number of people would increase the amount of disruption, disagreement, and distractions. Still others, citing such examples as assembly lines, saw no relationship between number of people and quality.

The research on people (primarily professionalism) suggests that as the level of personnel qualifications increases, delegation will increase and formalization decrease. The results in Table 1 (cells DE and DF) tend to support these relations in both groups. In addition, Hall (1972) suggests that rather than using less qualified persons and a high division of work, organizations may use higher qualified persons and a lower division of work. This suggests a possible negative influence of personnel competence on the division of work. The results here (cell DG) indicate that although there is high agreement that competence influences the division of work (high nonzero relations), there is little agreement as to whether that influence is positive or negative (low means and mean to nonzero relations ratio). Because no respondents commented on the rationale for the causality relation from personnel competence to the division of work, their thinking is not known.

Finally, both MBAs and managers see a strong positive direct causality link from personnel competence to the quality of work performance obtained (cell DH).

Technology and Structure. With respect to task variability, research suggests that increases in task variability will be associated with increases in delegation and decreases in both formalization and the division of work (Ford & Slocum, 1977). The results here, however, are not supportive of these relations. For MBAs, there is high agreement that task variability has a direct negative influence on formalization (cell AE). Managers, however, share little agreement as to whether the influence of task variability on formalization is positive or negative even though there is high agreement that a nonzero causality relation exists. Examination of respondents' written rationales indicates that with respect to formalization, some managers and MBAs saw task variability as literally rendering rules, policies, and procedures as useless. Others, however, saw a greater need for control through the use of formalization.

Although MBAs have a high level of agreement that task variability influences delegation, they have little agreement as to whether it is positive or negative (cell AF). Managers, on the other hand, do not agree that task variability has a nonzero influence on delegation (percent nonzero relations = .51) and, of those who do see such a relation, there is a low level of agreement as to whether the relation is positive or negative (mean = .21).

Although no conflicting written rationales were provided for the influence of task variability on delegation, the rationales provided were very consistent and are represented by the statements of one respondent: "If tasks vary greatly, authority must be delegated to those capable of doing the particular job. No leader can do it all."

In the case of the influence of task variability on the division of work (cell AG), there is moderate agreement among both MBAs and managers that task variability has a nonzero influence. However, the low means indicate that there is little agreement as to whether that influence is positive or negative. No conflicting written rationales were provided regarding the influence of task variability on the division of work or delegation. The rationales provided supported a negative influence of task variability as indicated by the statement of one respondent: "It's much easier to divide up routine tasks than variable ones because what's expected is clearly delineated. It's so much harder to divide up variable tasks and to pinpoint responsibility."

Increases in interdependence are suggested as leading to decreases in formalization and increases in delegation (Van de Ven et al., 1976). The results obtained here, however, indicate a general lack of agreement among both MBAs and managers as to the existence of a nonzero influence of interdependence on either formalization (cell BE) or delegation (cell BF). In fact, task interdependence is seen by both MBAs and managers to be as much a direct cause of delegation (percent of nonzero relations in cell BF) as a direct effect of delegation (percent of nonzero relations in cell FB). The only written rationales provided for the influence of interdependence on delegation supported a negative relation, as indicated by one respondent: "high degree of interdependence rules out delegation: the decision or task must be a group decision. Decisions affect all involved." No written rationales were provided for the influence of delegation on interdependence.

MBAs and managers also see the division of work as having a more direct influence on interdependence (percent nonzero relations in cell GB) than interdependence has on the division of work (percent nonzero relations in cell BG). Only one respondent saw a relation between interdependence and the division of work as a certain relation: "The more a task is subdivided, the more interdependence exists."

Finally, the results in Table 1 (cells AH and BH) indicate that although there is agreement that task variability and interdependence influence the quality of work performance obtained (indicated by percent of nonzero relations), there is little agreement as to whether that influence is positive or negative (as indicated by means and ratio of means to percent nonzero relations).

Structure and Performance. The results also indicate a lack of agreement as to the causality relations that exist among the structure variables (cells, EF, EG, FE, FG, GE, GF). Examination of the percent of nonzero relations indicates that a given dimension of structure is almost as likely to be seen as a direct cause or a direct effect of another dimension of structure.

Delegation tends to be seen slightly more as a direct cause of formalization than a direct effect (compare percent nonzero relations in cell FE to those in cell EF). The division of work also is seen slightly more as a direct cause of formalization than a direct effect (compare cell GE to cell EG), but is seen as a direct cause as much as a direct effect of delegation (compare cell GF to cell FG). Examination of written rationales indicated that only one respondent was certain of a causality relation and that was of a negative influence of formalization on delegation: "As the extent to which rules, policies and procedures used increases, the authority will be reduced."

With regard to the effect of structure on the quality of work performance, there is high agreement among both MBAs and managers that delegation has a positive influence (cell FH), and lesser agreement as to the existence and/or direction of influence of the division of work or formalization on quality (cells GH and EH, respectively).

Cumulative Causality Relations

The analysis to this point has focused on only the direct causality relations among variables. Although informative, this focus ignores the indirect effects of variables on each other. As a result, the cumulative influence (direct plus indirect effects) of a variable in the cognitive map is unknown. Therefore a *cumulative causality* or *cumulative reachability* matrix (Axelrod, 1976; Harary et al., 1965) was computed for each group. The cumulative reachability matrix allows one to examine the ultimate consequences of the direct causality relations specified in the adjacency matrix (Table 1). In this way, the total implications of a change in one variable on another can be assessed.

The cumulative reachability matrix (CR) is calculated by the formula:

$$CR = A + A^2 + A^3 + A^4 + \dots + A^{n-1}$$

where A is the adjacency matrix and n is the number of variables in the adjacency matrix. Raising the adjacency matrix to successive powers locates indirect paths between variables of the length of the power to which the matrix is raised. A^2 indicates the effects through paths of length 2 (e.g., the effect of B on D in $B \rightarrow C \rightarrow D$), A^3 the indirect effects through paths of length 3 (e.g., the effect of B on E in $B \rightarrow C \rightarrow D \rightarrow E$), and so on. If upon raising the adjacency matrix to some power, the value in cell ij goes to zero, then no indirect path of that length exists from variable i to variable j . The cumulative reachability matrix, therefore, indicates the cumulative direct and indirect effects of a variable on all other variables. The cumulative reachability matrices of the MBA and manager groups are shown in Table 2 and were calculated using the cell means of the aggregate adjacency matrices shown in Table 1.

Summing the absolute values in row i of the cumulative reachability matrix shown in Table 2 gives the *cumulative generalized outdegrees* of variable i .

Table 2
Cumulative Reachability Matrix,
Cumulative Generalized Outdegrees and Indegrees
for MBA and Manager Groups^a

<i>Variables</i>		<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	<i>Cumulative Generalized Outdegrees</i>
<i>Technology</i>										
A. Task variability	MBA	.13	.64	.67	.09	.07	.45	.99	.69	3.73
	MGR	.08	.77	.01	.25	-.21	.55	.50	.85	3.22
B. Interdependence	MBA	.17	.15	.01	-.03	.40	-.21	.27	.19	1.43
	MGR	-.16	-.01	-.10	.08	-.02	.12	.01	.54	1.04
<i>People</i>										
C. Size	MBA	-.03	.80	.23	-.20	2.27	-.79	1.56	-.70	6.58
	MGR	-.33	-.26	.35	-.35	2.10	-.55	1.20	-.20	5.34
D. Competence	MBA	.80	-.02	-.34	.30	-2.24	2.12	-.36	2.37	8.55
	MGR	1.10	1.20	-.90	.67	-2.40	2.00	-.03	2.70	11.00
<i>Structure</i>										
E. Formalization	MBA	-.03	.22	.05	-.04	.34	-.29	.42	.20	1.59
	MGR	-.28	-.11	.05	-.07	.21	-.03	.16	.33	1.24
F. Delegation	MBA	.27	.51	.10	.09	.03	.28	.47	1.11	2.86
	MGR	.41	.77	-.21	.38	-.76	.58	.16	1.50	4.77
G. Division of work	MBA	.11	.72	.58	.02	.99	-.09	.64	.52	3.67
	MGR	-.19	.37	.07	.08	.62	.22	.19	.74	2.48
<i>Performance</i>										
H. Quality	MBA	.10	.15	.03	.04	-.01	.23	.13	.13	.82
	MGR	.04	.06	-.07	.05	-.20	.18	-.07	.12	.79
<i>Cumulative</i>										
Generalized Indegrees	MBA	1.64	3.21	2.01	.81	6.35	4.46	4.84	5.91	
	MGR	2.59	3.55	1.76	1.93	6.52	4.23	2.32	6.98	

^aTop line in each row is MBA, bottom line is managers.

This indicates the cumulative causality of variable *i* on all other variables. Similarly, summing the absolute values in column *j* gives the *cumulative generalized indegrees* of variable *j*. This indicates the cumulative causality of all other variables on variable *j*.

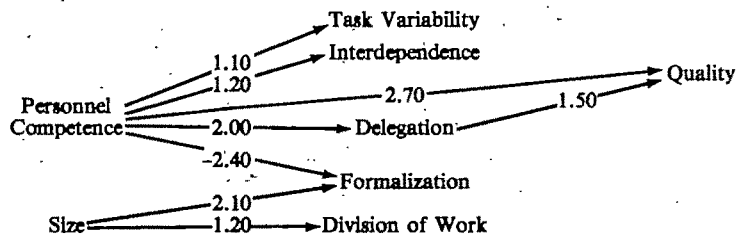
Comparison of the rank orderings of the cumulative generalized outdegrees for MBAs and managers indicates a high level of agreement as to which variables have the greatest cumulative causality ($r_s = .99$). The same is true with regard to the rank ordering of the cumulative generalized indegrees ($r_s = .98$). (These results would be expected, given the high level of agreement found between the adjacency matrices of the respective groups.)

Similarly, comparison of cumulative generalized outdegrees (Table 2) to generalized outdegrees (Table 1) for MBAs ($r_s = .98$) and managers ($r_s = .99$) indicates that the ordering of variables in terms of their influence on other variables is essentially unaltered by computing total effects. This replicates the findings of Bougon et al. (1977). Variables that have the greatest direct causality also have the greatest cumulative causality. The same is also true when comparing cumulative generalized indegrees to generalized indegrees (MBAs, $r_s = .99$; managers, $r_s = .99$). Variables that are subject to the most direct influence also are subject to the most cumulative influence.

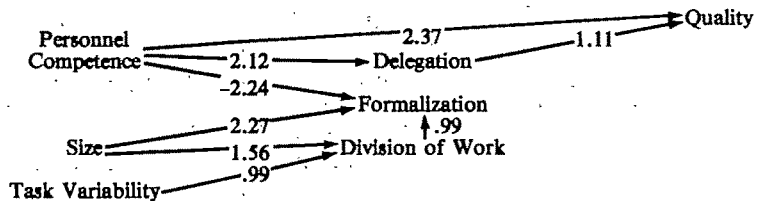
The cumulative reachability matrix also provides insight into the cumulative causality relation between any two variables. The larger the values in each cell of the cumulative reachability matrix, the greater the cumulative influence of the row variable on the column variable. If the cell values are low, either the influence of the row variable on the column variable is low both directly and indirectly, or the positive and negative direct and indirect influences of the row variable balance each other. Taking cell values in the cumulative reachability matrix greater than or equal to one (1) produces the cumulative causality maps shown in Figure 1 (.99 in cell AG and GE of Table 2 was rounded to 1 for diagram purposes in the MBA map in Figure 1).

Figure 1
Graphs of Largest Cumulative Causality Relations

MANAGERS



MBAs

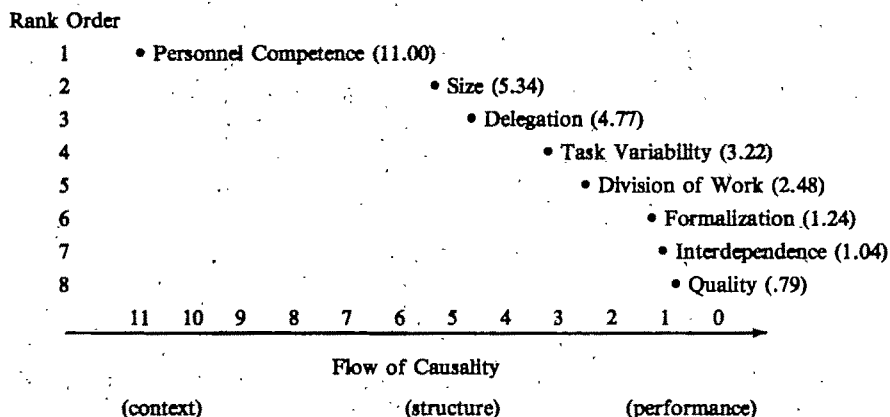


Visual comparison of the cumulative causality relations shown in Figure 1 indicates a very high degree of similarity between MBAs and managers in that many of the same variables and causality relations exist. In fact, both groups share the same "core relations" involving personnel competence, size, formalization, delegation, division of work, and quality. What differences exist involve the role of task variability, interdependence, and the division of work. Whereas managers see task variability as a consequence of personnel competence, MBAs see it as a cause of the division of work. Similarly, interdependence is not a part of the MBA map but is a consequence of personnel competence in the manager group. Finally, MBAs see the division of work as having positive cumulative causality on formalization, whereas managers do not. Thus, although the maps of the two groups are very similar, there are some differences.

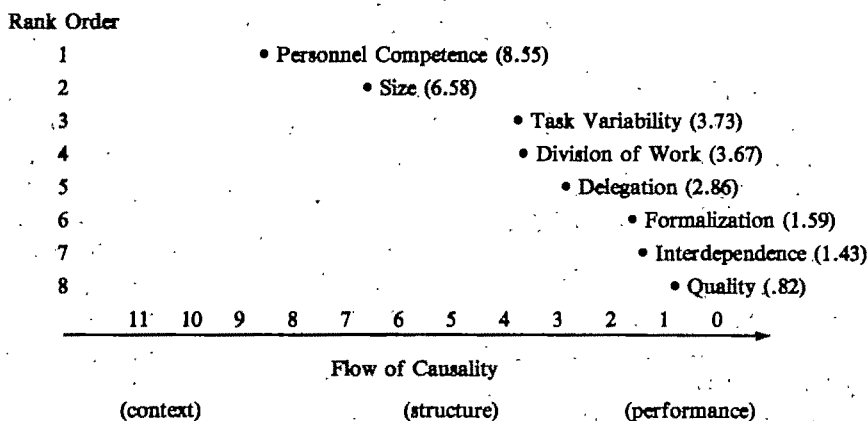
Because it considers the cumulative causality of the variables, the cumulative reachability matrix (Table 2) provides a better basis for evaluating

Figure 2
Cumulative Generalized Outdegrees

MANAGERS



MBAs



the basic proposition that context→structure→performance as it pertains to the cognitive maps obtained here. To examine this proposition, the cumulative outdegree of each variable was plotted against its rank ordering for both the MBA and manager groups. These are shown in Figure 2. If the flow of causality is from context to structure to performance, then the first four variables having the highest cumulative causality should be context, followed by the three structure variables and then the performance variable. A visual inspection of Figure 2 indicates that this flow of causality is largely supported in both groups. The exception is interdependence, which tends to be located more toward the structure than context end of the causality flow (see Figure 2). This suggests that respondents regard interdependence more as a structure variable (one that is influenced by context) than as a context variable.

Finally, the cumulative reachability matrix indicates that there are extensive self-reinforcing effects among variables and that some of these effects are relatively large. The self-reinforcing effects are found by looking at the diagonal values in Table 2. If the values are positive, a deviation amplifying condition exists. That is, an increase (decrease) in a variable leads to further increases (decreases) in that same variable. If the values are negative, a deviation-counteracting condition exists in which an increase (decrease) in the variable leads to a decrease (increase) in the same variable (Bougon et al., 1977). As is seen in Table 2, with the exception of cell GG, the diagonal values are all of a deviation amplifying form. For example, increases in size lead to further increases in size (cell CC in Table 2). Moreover in the manager group, personnel competence (cell DD) and delegation (cell FF) have relatively large amplifying effects (.67 and .58, respectively), suggesting that increases in personnel competence lead to still greater personnel competence and that increases in delegation lead to still more delegation. In the MBA group, only the division of work has a relatively large amplifying effect (.64), suggesting that increases in the division of work lead to still more division of work.

Discussion

The results of this exploratory study indicate a high level of agreement *between* the cognitive maps of a group of MBAs and a group of full time practicing managers regarding the causes and effects of structure. This agreement is reflected in the rank ordering of the eight variables on the basis of either direct effects (Table 1 generalized outdegrees) or total effects (Table 2 cumulative generalized outdegrees), as well as in the rank ordering of the direct causality relations depicted in Table 1. The cognitive maps of both groups indicate that personnel competence and size have the greatest direct and cumulative causality, and that the flow of causality is consistent with the basic structure-contingency proposition that context precedes structure, which precedes performance (Figure 2).

Although there is considerable agreement between the cognitive maps of the two groups, it nevertheless should be recognized that there also is considerable disagreement *within* both groups regarding specific causality relations. This disagreement is evidenced by the low to moderate percent of nonzero causality relations identified (indicating lack of agreement as to whether a causality relation exists) and the low to moderate ratio of mean to percent of nonzero causality relations (indicating lack of agreement as to whether a nonzero relation is + or -) in Table 1. Furthermore, although several specific direct causality relations are consistent with the existing structure-contingency literature (e.g., the influence of size on formalization), there are numerous other relations that are not (e.g., the influence of size on delegation and the influence of task interdependence on structure).

The high level of agreement between groups, when combined with the disagreement within groups, indicates that although individual decision

makers may share agreement that a particular variable (e.g., size) has causality relations with other variables, they do not agree as to which variable causes the other (e.g., does structure cause interdependence or interdependence cause structure?) or what the form of the relation is (+, 0, -). That is, individual decision makers do not share the same specific beliefs about the causes and effects of structure. In this respect, the results obtained here lend credence to the decision maker choice perspective. To the extent that beliefs about the causes and effects of structure influence organization structure, the results obtained here suggest that although specific variables will be very influential (e.g., size), the nature of that influence will vary according to the decision maker.

One finding of some interest is the importance attached to the people related variables (size and personnel competence) relative to that of the technology related variables. Although numerous studies—for example, Child and Mansfield (1972)—have found size to be a more significant correlate of structure than technology, it is not apparent why size should be more dominant here given that both size and technology are at the same level. One explanation may be found in the salience of people relative to technology. Tversky and Kahneman (1974) indicate that decision makers have a tendency to attach greater significance to more salient factors than would otherwise be justified based on their actual occurrence. That is, greater importance is attached to more salient factors even though those factors may be underrepresented in a sample of all possible factors. Because managers “manage people,” people would be expected to be more salient than other factors, such as technology. Managers do not “see” interdependence, they “see” that people are not working together. In this respect, the cognitive maps generated here may reflect variable salience more than “true” cause/effect relations. This would offer one explanation as to why the results obtained here regarding direct causality relations (Table 1) are not consistent with the structure-contingency literature in a number of cases.

Another finding of interest is the relative simplicity (i.e., few interdependent relations) of the cognitive maps of the two groups (see Figure 1). There are several possible reasons for this. One reason may be that decision makers cannot deal with very complex cause/effect maps because of information processing limitations (March & Simon, 1958). Rather, decision makers bound their rationality and, thereby, rely on relatively more simple cognitive maps. A second reason may be that because the variables included were generated by the researchers rather than the respondents (Bougon et al., 1977), the variables may not have been as salient to the respondents. And, finally, the maps may be relatively simple because of the experience base of the respondents. The respondents in this study are relatively young (most MBAs are in late 20s or early to mid-30s), and their organizational experience is necessarily less than would be found in older respondents. To the extent that experience influences the content of cognitive maps, the relative youth of the respondents here could have produced relatively simple maps.

The relative simplicity of the maps obtained here raises still another issue that should be considered in future research: that is, that the results obtained here are a function of sampling. If, as has been suggested, cognitive maps are a function of experience and socialization, then the finding that the respondents here do not all share the same experience or socialization (as evidenced by education and work backgrounds) would produce an "averaging effect." The same results, therefore, would not be expected to obtain if socialization and experience are more explicitly controlled. Extensive demographic data were not collected on the respondents, and this issue cannot be examined. For this reason, the results of this study are limited to the sample examined.

An assumption underlying the generation of cognitive maps and their potential link to decision maker choices regarding structure is that the maps generated represent actual theories of action rather than espoused theories of action (Argyris & Schon, 1978). This study did not place the respondents in the position of dealing with an actual structure choice problem, and it may well be that the maps obtained are more of the espoused than actual type. Whether this is the case, however, and to what extent remains an issue for future research. It may well be that the maps generated here are general maps that are modified for specific choice situations. If this is the case, then an issue of some significance is how the general maps are modified for specific situations.

That decision makers differ in their beliefs about the causes and effects of structure raises additional issues of some significance. One such issue centers on why decision makers hold the causality beliefs they do and how they acquire these beliefs. Although one might argue that the groups in this study merely reflect relatively institutionalized beliefs, such a position begs the question of how previous decision makers came to their beliefs about cause and effect relations regarding structure. If, as is suggested here, cognitive maps influence decision maker choices about structure, then understanding the evolution of cognitive maps would be instrumental in understanding organization structure and the evolution of structure.

Understanding the acquisition and formation of causality beliefs would be of considerable importance in understanding organization learning (Argyris & Schon, 1978; Duncan & Weiss, 1979). If, as suggested by Argyris and Schon (1978), organization learning depends on the cognitive maps and images of organization members, then the process of organization learning and adaptation may be understood better by examining the evolution and content of such maps. In this regard, cognitive maps are of potential significance in understanding the decision processes pertaining to adaptation (Weick, 1979).

Another issue of significance involves the process(es) by which differences in cognitive maps get resolved among decision makers. Most major corporate decisions, whether strategic or tactical, involve multiple decision makers. To the degree that these decisions involve ill-structured problems, variances in cause/effect beliefs become very important. If it is accepted

that design (structure) issues are ill-structured problems, then a better understanding of the cause/effect beliefs of those determining design can shed considerable light on the underpinnings of the design decision.

Contemporary organizations face turbulent environments that require frequent adaptive decisions in order to survive. These decisions must be made, in part, on the cause/effect maps that the decision makers use as a basis for evaluating various options they have available. A better understanding of what these maps are, how they are developed, and how they are used will further the understanding of both individual and organizational behavior.

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Strategy and Structure of U.S. Multinationals: An Exploratory Study

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Large U.S. multinational companies are classified by the structure through which their foreign operations report to headquarters. Structural groups then are compared by the use of such variables as product diversity, dependence on foreign operations, strategic emphasis, and ownership and control characteristics, with a resulting model relating these variables to multinational structure.

This study explores factors influencing international organization structure in 93 large U.S. multinational companies having substantial foreign activity. Organization structure is determined by the way a "typical" foreign operating unit reports up through each firm's corporate hierarchy. Company parameters examined as potential influences of organization structure are diversity, foreign activity, strategic emphasis, integration among facilities in different countries, and the establishment and ownership pattern of foreign facilities. The overall purpose of the study is to develop a theoretical framework that explains the reasons for selecting a particular organizational design.

Background

There are three reasons for believing that organizational characteristics might influence multinational structure. First, several prior authors have argued such a relationship. For example, Chandler showed that diversity influenced organization design (1966), and he hypothesized that foreign involvement would do so too (1975). A major study by Stopford and Wells (1972) also found these two variables to be strong predictors of multinational structure. More than a decade has transpired since the completion of these studies, however. Furthermore, the intervening period has been marked by considerable disillusionment with structures widely heralded earlier

(Vernon, 1980) and by much publicity about structures that were virtually unknown then (Davis, 1976; Davis & Lawrence, 1978; Galbraith, 1971). It therefore seemed useful and timely to undertake a new investigation—especially one that would include a larger number of variables than those examined in earlier studies.

The second reason for expecting a relationship between organizational characteristics and multinational structures is the recent findings of those investigating change within U.S. multinationals (Beer & Davis, 1976; Cascino, 1979; Dance, 1969; Goggin, 1974; McKern, 1971; Menzies, 1980; Prahalad, 1976). These case studies of individual companies show that changes in organizational parameters such as size, diversity, foreign activity, and personnel deployment patterns often lead to shifts in multinational structure. The present authors were reluctant to make hypotheses based on these studies because in most of them neither the names of firms nor precise organizational parameters were revealed. One proposition, however, was adopted. Both the case studies and Stopford and Wells (1972) indicated that a growing dependence on foreign operations led to organizational change. This was especially true of highly diverse firms. It therefore was expected that the present study would show different structures at different levels of foreign sales and diversity.

A third reason for thinking that multinational structure might relate to other organizational characteristics is the evidence that firms often establish practices that have been adopted by leaders in their industries. For example, Westinghouse's decision in 1971 to replace its international division with a worldwide product structure is reported to have been importantly influenced by GE's adoption of the latter structure several years earlier (Daniels, Ogram, & Radebaugh, 1982). Knickerbocker (1973) provides further evidence for this leader-follower phenomenon. He found that after one firm in an industry makes an investment abroad, competitors typically follow fairly quickly by investing in the same locale.

Method

The method used involved selecting and measuring operating variables that might influence multinational structure, classifying multinational structures, and choosing firms for investigating the relationship between these two kinds of variables.

Operating Characteristics

Most of the data on firm operating characteristics used in the study were obtained from published sources, the primary source being Standard and Poor's Compustat II tapes. For gaps in the tape data, supplementary information was obtained from Securities and Exchange Commission 10K reports. The *Forbes* industrial classification ("Where to Find the Company," 1981) was used to categorize firms by industry.

Product diversity was selected as a possible predictor of organization structure because of the previously cited research by Chandler (1966) and Stopford and Wells (1972), which indicated that high diversity leads to the utilization of worldwide product structures. The proxy selected for this measure was the number of two digit Standard Industrial Classification (SIC) code industries in which a firm participated.

Individual case studies and Stopford and Wells (1972) noted that increasing foreign involvement often leads to organization change. Therefore, foreign involvement was selected as one of the independent variables, and it was measured as the ratio of foreign to total corporate sales.

Stopford and Wells (1972) found that heavy reliance on R&D leads to early abandonment of an international division. It seemed plausible that multinational structures therefore might be influenced not only by this, but by other strategic variables as well. R&D and two other strategic variables—marketing and capital intensity—therefore were selected for examination. The proxies used to measure these variables were, respectively, research and development expenditures as a percent of sales, advertising expenditures as a percent of sales, and number of employees divided by asset value.

Because organization structure is a control mechanism, it was decided to examine some international practices that might present control problems. Three such practices were selected for examination—use of shared ownership when investing abroad, acquisition rather than start-up of new foreign ventures, and integration of foreign operations across national boundaries. Information on these practices was not available from published sources. Questions on these matters therefore were included in the questionnaire sent out to sample companies. Specifically, respondents were asked to identify a typical foreign operating facility and then report (1) whether it had been originally acquired or was started up internally, (2) the parent's percentage ownership of the facility, and (3) the degree of production integration between the facility and facilities in other countries.

To investigate possible leader-follower influences on organization structure, *Forbes* 1981 industrial classification ("Where to Find the Company," 1981) was used to classify respondent firms by industry. It lists 49 industries, 32 of which are primarily manufacturing. Respondents in the study participated in 24 of these 32 industries. Five or more of the respondents were uniquely classified (*Forbes* classifies some firms in more than one industry) in six of these 24 industries: energy, 9; chemicals, 7; auto supplies, 6; drugs, 6; branded food, 5; and conglomerates, 6. These 39 uniquely classified firms thus formed a subset for examination.

Multinational Structures

Several studies have classified companies' organization structures according to their placement of international operations (Alpander, 1978; Egelhoff, 1980; Franko, 1973; Lovell, 1966; Stopford & Wells, 1972). Although these

studies have differed in many respects, they agree on two points. The first is that it is useful to classify firms according to a few pure structural types through which foreign operations report. Basically, five classifications have been used throughout the present study: worldwide functional, worldwide product, international division, area, and matrix structures.

In a worldwide functional structure, top-level line executives have worldwide responsibility for separate functions, for example, for manufacturing, sales, engineering. In a worldwide product organization, top-level line executives are responsible for one or more worldwide business(es). In an international division form of organization, two kinds of line executives report to the chief operating officer. All but one of these are managers of domestic activities, whereas the remaining executive is in charge of all the company's foreign business. Executives reporting to the chief operating officer in an area organization are responsible for all company businesses within specific geographic regions of the world. The defining characteristic of a matrix organization is the simultaneous reporting by middle level line executives to two or more bosses who do not themselves have exclusive line authority.

The second point of agreement in the prior studies is that, although structural types may be fairly easily defined, classifying companies according to them is difficult. Structures, to some extent, may be mixed because of growth and personnel dynamics. There may be uncertainty about who has the authority over certain decisions, especially if dual relationships exist with line and staff personnel. Managers may continue to use old labels even though the organization has changed; or a structural type may be referred to before it is completely in place. Some discretion therefore is inevitable when classifying firms, regardless of whether the researcher or company respondents do the classifying.

The authors felt that it was more important to minimize company-to-company differences in interpretation than to get types of structures by people with first-hand knowledge of the operations. Therefore, structures were classified by the authors. The information used was obtained by asking respondents in sample companies to trace the flow of financial consolidation from a "typical" foreign production facility to successively higher levels, up to the level of the chief operating officer. If more than one path existed for the same foreign facility, respondents were asked to trace each. Respondents described the breadth of product, function, and geographic responsibility at each successive level so that the expanding breadth of responsibilities could be characterized as one moved upward in the organization. The use of financial consolidation as an indicator of organization structure was based largely on studies showing this to parallel the primary line of superior-subordinate relationships. Personal reward systems and resource allocations largely follow these same lines (Reece & Cool, 1978). This information was requested from the chief financial officer in each firm

because he was believed to be knowledgeable about the overall consolidation process. These individuals were asked to trace the reporting relationship for a "typical" Canadian and a "typical" non-Canadian foreign manufacturing or processing operation. It was recognized that respondents had to exercise discretionary judgment to decide what is typical. Firms then were categorized on the basis of these data, and the resulting classifications were checked against organization charts that respondents also were asked to supply. If there were no official organization charts, respondents sketched what one might currently look like. Finally, telephone interviews were used to fill gaps and to clear up inconsistencies.

Managerial responsibility was classified as to type and geographic domain. The former was designated either functional (e.g., just for manufacturing) or product (e.g., manufacturing and sales). Three geographic classifications were established: global (the entire world), international (the globe excluding the United States or the United States and Canada), and regional (an international subregion that may or may not include the United States). A firm's overall organization structure was determined by the responsibility of the executive immediately below the level of the chief operating officer to whom the "typical" foreign facility ultimately reported. Thus, a company was classified as functional or product, depending on the kind of responsibility of this individual. Each of these categories then was subdivided further according to the geographic responsibility of this individual—that is, global, international division, or area. If responsibility was traced to more than a single individual, the firm was classified as matrix.

Sample Selection

Four criteria guided the selection of firms for study. First, only large companies (i.e., those included on the *Fortune* 500 list) were examined. Large firms were judged to be particularly interesting because typically they have become multinational before others and because they control an even greater share of U.S. foreign than of U.S. domestic investment (Daniels et al., 1982). Large firms therefore were likely to have significant foreign operations and to be leaders rather than followers in selecting organization structures to handle foreign activities.

A second selection criterion involved firm nationality. Most studies that have attempted to relate operating variables to multinational structure have dealt in whole or in large part with non-U.S. firms (Egelhoff, 1980; Franko, 1973; Gordon, 1970; Schollhammer, 1971). It was decided to focus exclusively on U.S. multinationals because they typically derive a far larger percentage of their sales and profits from their domestic market than do foreign multinationals. The problem of balancing business, functional, and geographic perspectives (Bartlett, 1979; Davis, 1976; Prahalad, 1976) therefore is likely to be different for them than for their foreign counterparts. It thus seemed desirable not to mix the two kinds of company in the same study.

A third selection criterion involved importance of foreign activity. The desire was to study only firms for which international organization design is a significant issue, and this is unlikely if foreign involvement is very low. The Financial Accounting Standards Board now requires, under ruling 14, that U.S. firms provide segmented information on foreign operations when the latter are "significant"—that is, when they account for 10 or more percent of a firm's total activity. The study was limited to firms that met this minimum significance criterion.

A final selection criterion involved location of foreign facilities. Excluded from the sample were firms whose foreign facilities were limited exclusively to Canada. This exclusion was made because the Canadian operations of U.S. multinationals are often substantially integrated with their U.S. operations. One study noted, for example, that 60 percent of U.S. multinationals using an international division incorporate their Canadian facilities within their U.S. domestic divisions (Lovell, 1966).

The procedure for selecting firms that would meet these requirements was the following. First all firms in the 1978 *Fortune* 500 that segmented their foreign operations were identified. There were 256 such firms. Because there was no certain way of determining how many of the 256 had operations in countries other than Canada, questionnaires were sent to all of them, and 97 firms completed the questionnaire. Of the 97, 3 were discarded because the firms had foreign operations only in Canada. A fourth was later discarded because accurate financial data were not available on the firm from public sources. The final sample, therefore, consisted of 93 companies, or 36 percent of the firms surveyed and 37 percent of those that might have operations outside of Canada.

Of the 93 usable responses, the authors were comfortable in classifying 92 according to one of the five organization types defined earlier. The remaining one was so heterogeneous in its lines of reporting that it was simply called "mixed." These 92 were classified as follows: worldwide functional ($n = 10$, $\% = 11$), worldwide product ($n = 33$, $\% = 36$), international division ($n = 37$, $\% = 40$), area ($n = 11$, $\% = 12$), and matrix ($n = 1$, $\% = 1$). Because of only one matrix response, the analysis of the data excludes that firm.

Findings

Because this was an exploratory study, a number of things were tried in order to find relationships between independent variables and organization structure. Structural group means were compared by *t* tests for all variables and multiple cells by chi square. Firms were placed in rank order for each variable to see if there was concentration in any value area (e.g., from highest dependence on foreign sales to lowest, to see where area structures versus worldwide product structures were concentrated). Scatter diagrams were made for each pair of variables to see if the combination of any two variables resulted in groupings. The results given are limited to those for

which a logical theoretical basis for the relationship discovered could be provided.

Worldwide Functional

Table 1 shows that companies handling their foreign operations through a worldwide functional structure could all be classified as having low or medium product diversity. This is as one might expect, based on Chandler's earlier work (1966). It seems safe, therefore, to say that highly diversified firms are not likely to handle their foreign operations through a worldwide functional structure. It cannot be said as comfortably, however, that low diversified firms are apt to handle their foreign operations through a worldwide functional structure. Although chi square analysis showed a significant difference at $p < .01$ between functional and product usage by diversity groups, a substantial portion of firms with low diversity (77 percent) are not using a worldwide functional structure.

Table 1
Organization Structure by Product Diversity^a

	Diversity		
	Low	Medium	High
Worldwide functional of diversity group	$n = 6$ 23%	$n = 4$ 9%	$n = 0$ 0%
of organization type	60%	40%	0%
Worldwide product of diversity group	$n = 5$ 19%	$n = 14$ 33%	$n = 14$ 64%
of organization type	15%	42.5%	42.5%
International division of diversity group	$n = 10$ 39%	$n = 20$ 46%	$n = 7$ 32%
of organization type	27%	54%	19%
Area of diversity group	$n = 5$ 19%	$n = 5$ 12%	$n = 1$ 4%
of organization type	45.5%	45.5%	9%

^aLow diversity = 0-6 two digit SICs; medium diversity = 7-13 two digit SICs; high diversity = 14-30 two digit SICs.

Why do some firms with low product diversity use a functional structure but most do not? It was thought that the explanation might lie in relative dependence on foreign operations. Chandler (1975) hypothesized that functional structures would give way as dependence on foreign operations increased. This, however, was not the case. Table 2 shows clearly that the firms with functional structures were not concentrated among those with lower dependence on foreign operations. In fact, their ratio of foreign to total sales was highly varied, ranging from 3.7 percent to 77.6 percent.

On looking elsewhere for an explanation, it was discovered that the 10 functional firms were all raw material extractors—8 of them involving energy and distinguished by high capital intensity. Of these 10, 8 appeared among the 10 most highly capital intensive firms in the sample (i.e., employees to

Table 2
Organizational Structure by Dependence on Foreign Sales^a

	<i>Foreign Sales</i>		
	<i>Low</i>	<i>Medium</i>	<i>High</i>
Worldwide functional	<i>n</i> = 1	<i>n</i> = 6	<i>n</i> = 3
of sales group	6%	14%	10%
of organization type	10%	60%	30%
Worldwide product	<i>n</i> = 11	<i>n</i> = 15	<i>n</i> = 7
of sales group	65%	34%	23%
of organization type	33%	46%	21%
International division	<i>n</i> = 4	<i>n</i> = 21	<i>n</i> = 12
of sales group	23%	48%	40%
of organization type	11%	57%	32%
Area	<i>n</i> = 1	<i>n</i> = 2	<i>n</i> = 8
of sales group	6%	4%	27%
of organization type	9%	18%	73%

^aWhen foreign sales as percent of total sales was less than .13, classification was low; when between .13 and .3, classification was medium; and when .3 and above, classification was high.

assets ratio of less than .01). Raw material extractor firms deal largely with very homogeneous raw materials that do not have to be altered substantially from one country to another. Their key strategic need therefore is coordination among functions (e.g., exploration, productions, and sales), not new product introduction or marketing. This need is reflected by their relatively high integration score, shown in Table 3. Very likely to avoid complications that might impede functional coordination, these firms generally have not used shared ownership or acquisitions when establishing foreign facilities (see Table 3).

Table 3
Organization Structure by Control Problem

	<i>Ownership</i>		<i>Acquisition Method^a</i>		<i>International Production Integration</i>	
	<i>100%</i>	<i>Shared</i>	<i>Start-Up</i>	<i>Buy-In</i>	<i>High</i>	<i>Low</i>
Worldwide function						
<i>n</i>	10	0	9	0	4	6
%	100	0	100	0	40	60
Worldwide product						
<i>n</i>	29	4	17	15	9	24
%	88	12	53	47	27	73
International division						
<i>n</i>	28	5	22	13	15	20
%	85	15	63	37	43	57
Area						
<i>n</i>	9	2	8	3	4	7
%	82	18	73	27	36	64

^aIn some cases the MNC participating in this study acquired a U.S. firm that already had foreign operations of its own. If the acquired U.S. firm, itself, had established the typical foreign facility, the acquisition method was classified as start-up.

Worldwide Product

Shared common characteristics did not as easily set apart firms with worldwide product structures as they did those using worldwide functional structures. The worldwide product group included firms with a wide range of product diversity, dependence on foreign sales, and strategic variables employed. Some tendencies were found, however. For instance, a high portion of the firms with a worldwide product structure (85 percent) were classified as having medium or high product diversity.

Some firms with low diversity nevertheless had a worldwide product structure, and some with high diversity did not. Why? Consider first the former. Table 4 shows them to be significantly less involved internationally than firms using international division or area structures. This finding suggests that at a low level of foreign investment, foreign operations may be best handled by domestic product divisions. However, as foreign sales increase, there is a need to combine foreign operations by forming either an international or an area division structure. This shift may come about for several reasons: to prevent duplication of specialized international activities; to create a new division of about the same size as the existing ones; or to focus on an area that has demonstrated recent growth.

Table 4
Strategic Variables
Mean Values (Standard Deviations)

Strategic Variable	Diversity Level	Organizational Structure		
		Worldwide Product	International Division	Area
Foreign Sales/Corporate Sales	High	.27 (.154)	.32 (.159)	.18 (.000)
	Medium	.20 (.114)	.29 (.156)	.40 (.154)
	Low	.18 [†] (.051)	.29 [§] (.138)	.39 ^{§§} (.188)
R&D Expenditures/Corporate Sales	High	.017 (.013)	.045 (.007)	.010 (.000)
	Medium	.023 (.020)	.024 (.024)	.020 (.010)
	Low	.015 (.009)	.014 (.011)	.025 (.020)
Advertising Expenditures/Corporate Sales	High	.016 (.006)	.019 (.011)	(NA) (.000)
	Medium	.017 ^{††} (.027)	.020 ^{§§} (.012)	.018 (.013)
	Low	.059 (.000)	.025 ^{§§} (.030)	.100 [‡] (.078)
Total Employees/Corporate Assets	High	.031 ^{††} (.010)	.019 ^{§§} (.004)	.021 (.000)
	Medium	.027 (.010)	.024 (.008)	.018 (.008)
	Low	.021 (.011)	.022 (.012)	.028 (.023)

[†]Significantly different ($p < .1$) from worldwide product firms at same diversity level.

^{††}Significantly different ($p < .1$) from international division firms at same diversity level.

[‡]Significantly different ($p < .1$) from area firms at same diversity level.

[§]Significantly different ($p < .05$) from worldwide product firms at same diversity level.

^{§§}Significantly different ($p < .05$) from international division firms at same diversity level.

^{‡‡}Significantly different ($p < .05$) from area firms at same diversity level.

At high diversity levels, dependence on foreign operations did not significantly differentiate organization structures, although the authors had expected that it would—that is, that product divisions would be adopted as foreign involvement and product diversity increased simultaneously.

Contrary to expectations, however, the international division firms in this category actually had higher foreign sales on average than did those with worldwide product structures.

The variable that best predicted whether a high diversity firm would use a worldwide product rather than an international division structure was the method of entering new businesses. All six sample firms that *Forbes* classified as conglomerates—firms that diversify primarily by acquisition—fell in the high diversity category, and all six used worldwide product structures. This preference of acquisitive diversifiers for worldwide product structures may stem from their special need to provide divisions a high level of operating autonomy (Berg, 1973; Pitts, 1977a, 1977b).

The outstanding characteristic of the seven high diversity firms using international divisions was their high level of R&D expenditure, which averaged 4.5 percent of sales, compared to only 1.7 percent of sales for the high diversity firms using worldwide product structures. Why the technologically-oriented firms chose international divisions rather than worldwide product structures is discussed in the next section.

International Division

The international division structure conceivably can operate alongside a domestic structure that is organized by either function or product; however, of the 37 international division firms examined, 36 organized domestic activities along product lines. The international division, therefore, is largely a special structure adopted by companies that depend domestically on product divisions.

Why do some firms with product divisions choose to separate their foreign operations into a separate international division? The evidence suggests that dependence on foreign operations exerts an important influence. Consider the data in Table 4. Regardless of level of diversity, firms using international divisions have higher dependence on foreign sales than do those using worldwide product structures. Further support for the same tendency comes from data on specific industries. Two industry groups, energy firms and conglomerates, have been discussed, with the conclusion that their special characteristics determine the types of structures that they use. Of the remaining four industries that were examined separately, three (auto suppliers, branded foods, and chemicals) follow the pattern of going from worldwide product to international division as foreign sales grow as a percentage of total sales. In every case for these industries, firms with an international division have higher dependence on foreign sales than do those companies in the same industries with worldwide product structures.

Traditional theory argues a reverse tendency for high diversity firms—that is, replacement of international division structures by worldwide product designs as foreign involvement increases. Those making this claim argue that domestic divisions possess the product expertise needed by foreign units, yet are reluctant to transfer it when the latter reside in an international

division (Chandler, 1975; Fouraker & Stopford, 1968; Stopford & Wells, 1972). The solution, claim these authors, is a reorganization that does away with the international division and places foreign responsibility for products within worldwide product divisions.

The present findings conflict directly with this conclusion. As shown in Table 4, foreign involvement was higher for international division than for worldwide product firms even in the high diversity subgroup. The reason why high diversity multinationals do not shun international divisions, as traditional theory proposes, perhaps is to be found in several recent investigations that show that, except for conglomerates, such firms do not turn over resources entirely or even mainly to product divisions, but rather centralize them to a considerable extent at the corporate level. Such centralization has been shown for R&D (Berg, 1973; Pitts, 1977a), personnel (Galbraith & Edstrom, 1976; Pitts, 1977b), marketing (Aylmer, 1970), and finance (Stobaugh, 1970). In firms in which such centralization has taken place, foreign units need not rely on domestic divisions for needed resources. They can obtain them directly from the corporate level in much the same way that domestic product divisions do. An additional explanation for the present finding may be found in Bartlett's (1979) research. He concluded that an international division promotes foreign expansion more effectively than does a worldwide product structure because it places a spokesman for geographic interest at the same level as spokesmen for product and functional interests.

The traditional view thus would appear to apply only to conglomerates. They do not typically centralize key resources, and their foreign units must rely much more heavily on domestic product divisions for help. Under such conditions, a worldwide product structure, which provides the latter direct incentive to help the former, is needed to ensure effective exploitation of foreign potential.

Area

Whereas area organizations are widely used by European firms (Franko, 1975), few U.S. firms (12 percent) employing this structure were found in the present study. Its limited use by U.S. firms may be attributed to the usual dominance of the U.S. market. Only one third of the respondents had foreign sales comprising as much as 30 percent of total sales; consequently, an area division comprising U.S. operations usually would be much larger than the two or more foreign area divisions. It is not surprising, therefore, that companies using area structures were found almost entirely among the firms with high foreign sales (Table 2).

Evidence also was found that firms may move from international divisions to area structures as foreign sales increase. In those same three industries (auto supplies, branded foods, and chemicals) in which there appeared to be a move from worldwide product to international division as foreign sales increased, there was a move to area structures at an even higher

foreign sales level. Of the 18 firms examined in these industries, only 1 firm was an exception to this pattern.

But then why do many firms with a high dependence on foreign sales utilize other structures? The answer here seems to lie in the diversity factor. Table 1 shows that the area structure is concentrated among companies with low and medium diversity. It already has been speculated that acquisitive diversifiers are not good candidates for any structure except the worldwide product one. The tendency of internal diversifiers to choose international divisions also has been discussed. But why do the latter not switch to an area structure as foreign sales grow?

The answer may lie in their need to exploit new products in different foreign markets quickly but sequentially (Stobaugh, 1969). It seems logical that the sequencing of countries for exploiting new products will be more coherent when only one division makes such decisions than when several area divisions compete to get a new product before the others. This notion is consistent with Davidson's (1980) finding that the international division is the fastest structure for transferring new products abroad. Once again this finding is counter to what was expected at the start of our study.

At a low level of diversity, it was found that companies with area structures have a significantly higher advertising intensity than do firms with international divisions. Although this difference does not show up at higher diversity levels, it does lead to the intriguing possibility that the area structure is preferable when marketing is the major competitive advantage. Spillover of advertising from one country to another, for example, may necessitate regional control.

Implications and Conclusions

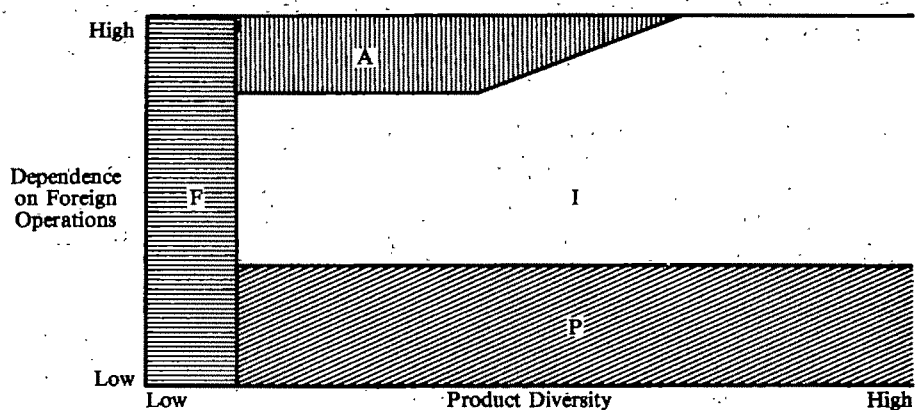
Based on a substantial literature, it was expected that companies with a given organization structure generally would have some characteristics different from those of firms with other structures. Rather than testing a theory as to which characteristics relate to which structure, a theoretical framework, based on the findings, was developed. A number of studies were used to guide in the selection of variables, and some preliminary expectations based on those studies were set up. Nevertheless, the method of inquiry was essentially exploratory.

Even as an exploratory study, some inherent limitations are recognized. First, the study is based on a group of firms that may not be representative. All the firms are large; and the only ones included are those that completed the questionnaire, could be classified according to one of five organizational types, and for which substantial operating data are available from public sources. Second, respondents, in describing foreign operations, had to use personal discretion to determine what is a typical foreign operation. The researchers, in turn, had to use further discretion in order to classify their responses. The methodology forced placement of each firm into a single organizational category. Such "pure" structures are rare. In future research

it may prove useful to score each firm on the degree to which it utilizes various multinational structures. Third, the analysis of company characteristics is not exhaustive. Some important variables may have been overlooked. For some variables, the cell sizes were too small to test conclusively. For others proxies had to be used as indicators of characteristics of interest. Finally, the perspective is limited. Examination was made of a cross-section of firms at a given time, and inferences were made as to how structures evolve; historical analysis might have yielded different results.

Despite these weaknesses and limitations, the findings shed preliminary light on important factors influencing the choice of organization structure of U.S. firms that have significant foreign operations. Furthermore, there are logical explanations for the way these factors exert such influence; thus, there are theoretical underpinnings for further development. If future research supports the framework that these findings suggest, then students and practitioners may better understand how and why multinational firms adopt specific organization structures. Figure 1 summarizes what is hypothesized from the findings.

Figure 1
Structural Evolution of
Nonconglomerate U.S. Multinational Firms^a



^aF = Functional; P = Product; I = International Division; A = Area.

As long as foreign sales are low as a portion of total sales, most companies handle foreign operations merely as an appendage to existing product or functional divisions. Although firms with worldwide product and worldwide functional structures together comprised 47 percent of the total sample, they made up 71 percent of the firms whose foreign sales were no more than 13 percent of their total sales.

Whether firms at a low foreign sales level adopt a functional or a product structure depends primarily on their level of product diversity. All the

firms with a functional structure are classified as low or medium diversifiers, whereas 85 percent of firms with a worldwide product structure are medium or high diversifiers.

Increasing dependence on foreign sales seems to be the major impetus for change from a worldwide product to an international division structure. Most worldwide product firms (79 percent) had low or medium levels of foreign sales, whereas most international division firms (89 percent) fell in the medium and high foreign sales categories. The separation of international activities takes place in order to create a spokesman for geographic expansion at the same organizational level as spokesmen for product and functional interests. An international division head is able to handle high product diversity, contrary to traditional theory, because many functional responsibilities are put under corporate as opposed to divisional control.

Once an international division grows to be larger than domestic product divisions, there is a tendency to split it into two or more areas to provide better balance among divisions in terms of size. This tendency is less pronounced among firms that become diverse through internal development of new products, however. They tend to maintain international divisions, despite high levels of foreign sales, to ensure effective sequencing of new product introduction abroad.

Conglomerates are a case apart. Like their nonconglomerate counterparts, they typically adopt a worldwide product structure early in their diversification. However, because of their reluctance to disturb divisional autonomy, they generally do not discard it in favor of international division and area structures as their foreign sales and/or diversity increase. Instead, they tend to retain a worldwide product structure even after achieving very high values with respect to these two parameters.

It is hoped that future researchers will find this framework useful for developing and testing additional hypotheses about the effects of operating characteristics on international organization design. Although directional support has been found for the relationships discussed here, more conclusive data are necessary in order to support or reject the tentative findings.

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Individual Exploration to Organizational Commitment or Withdrawal¹

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The organizational commitment or withdrawal process was investigated for a sample of 85 individuals using a longitudinal research design and path analysis. Career exploration activity two months prior to entry predicted organizational entry and socialization variables, which in turn predicted early job attitudes and intentions. Intention to quit predicted subsequent exploration behavior and turnover.

The various processes by which individuals explore, enter, become committed to, or leave work organizations have received extensive attention over the past decade. For example, the career exploration process has been examined by Stumpf, Colarelli, and Hartman (1983b), and Greenhaus and Sklarew (1981); the organizational entry process by Wanous (1976, 1977, 1980); the organizational socialization process by Feldman (1976, 1981) and Louis (1980); the organizational commitment process by Steers (1977), Mowday, Steers, and Porter (1979), and Mowday, Porter, and Steers (1982); and the withdrawal process by Mowday et al. (1982), Mobley (1977, 1982), and Mobley, Horner, and Hollingsworth (1978).

Much of the organizational theory and empirical research in these areas supports a general exploration → organizational entry → socialization → commitment or withdrawal process model from the individual's perspective. Typically, the research conducted examines only a portion of this proposed model. For example, Stumpf et al. (1983b) focus on the exploration process prior to organizational entry; Wanous (1976) addresses job expectations at entry and their subsequent changes during initiation and socialization; Feldman (1976, 1981) analyzes the constructs of entry and socialization processes (e.g., person-job congruence, mutual influence) and their effects on early job outcomes (e.g., work satisfaction); Mowday et al. (1979)

¹The authors appreciate the assistance of Jonathan Horwitz, Maura Lockhart, and Amy Williams in data collection and analysis.

examine commitment in relationship to work outcomes (e.g., job satisfaction and performance) and withdrawal; Mobley et al. (1978) study the withdrawal process including job satisfaction, intention to explore, intention to quit, and turnover.

Collectively, these areas of research suggest a cyclical process in which an individual explores the environment for several work opportunities, accepts one opportunity and chooses to enter an organization, and experiences some form of socialization, whereby one both influences and is influenced by the organization, which results in the individual attaining a level of work motivation, perceived success, work satisfaction, and organizational commitment. To the extent that one's organizational commitment is low, initial intention to quit is more likely, as well as are subsequent exploration behaviors, to generate other, more suitable work opportunities. With appropriate, alternative job offers, the individual may leave the original organization in order to accept a new work opportunity, enter the new organization, and again experience a process of socialization. Steers and Mowday (1981) have proposed a comprehensive model of the processes that precede the decision to participate in or to withdraw from the organization. In contrast with the previously mentioned studies, which focus on a specific segment of the model, Steers and Mowday suggest the general need to test comprehensive models of the turnover process.

Following this suggestion, the purpose of this research is to examine the sequential process of exploration to entry to socialization to organizational commitment or subsequent exploration and withdrawal. The model, presented as Figure 1, hypothesizes specific linkages among variables in a cause-effect network. Path analysis is used to examine the extent to which data collected at three points in time on a sample of individuals exploring work opportunities and entering organizations support the model.

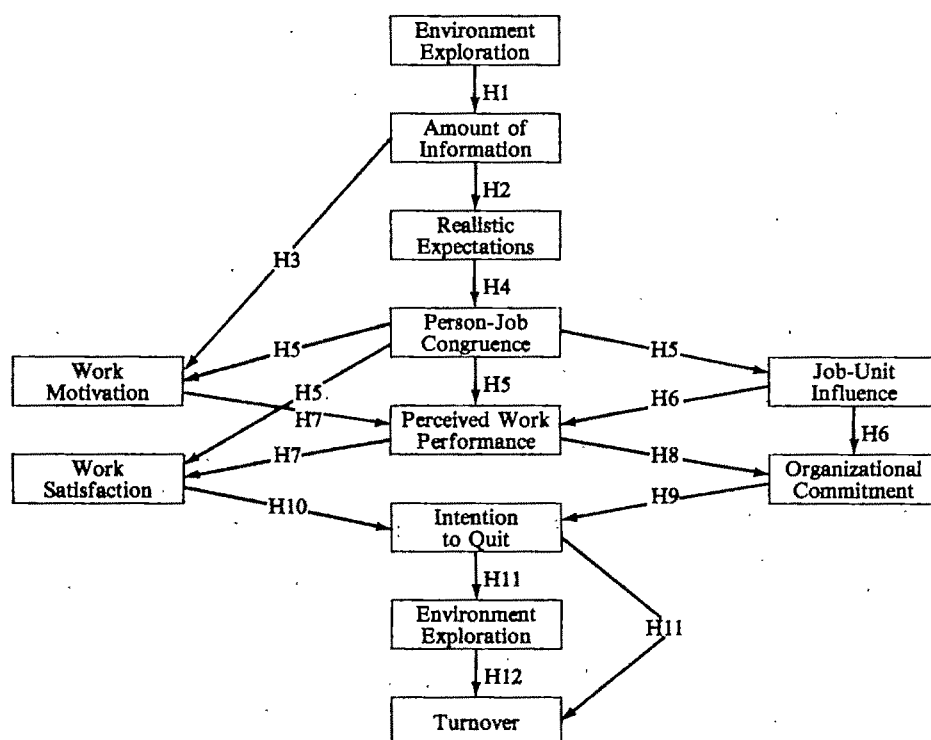
Development of Hypotheses

Individual Exploration and Organizational Entry

Mowday et al. (1982) suggest three stages in the development of organizational commitment: preentry (anticipation), early employment (initiation), and middle to late career (entrenchment). The first two stages parallel the anticipatory socialization phase (e.g., Merton, 1957) and the socialization phase (e.g., Feldman, 1976, 1981; Wanous, 1980) frequently discussed in the literature.

Steers and Mowday (1981) suggest that although many current models of turnover ignore the role of available information on the individual's decision to participate, this potentially important variable needs to be examined in a comprehensive model of turnover. The initial stage of preentry or anticipatory socialization should include exploration activities in which the individual explores the environment for important, career-relevant information. Career exploration is defined herein as purposive behavior and

Figure 1
The Process of Becoming Committed to an Organization



cognitions that afford access to information about occupations, jobs, and organizations that was not previously in the stimulus field (Berlyne, 1965). The collecting of career-relevant information subsequently influences the formation of work-related decisions and attitudes, as well as organizational commitment at entry (Mowday et al., 1982). These early experiences help to stabilize later organizational commitment, which is negatively related to initial intention to withdraw.

The individual explores the environment in order to obtain career-related information. However, not all exploration behaviors lead to the assimilation of new, accurate, and useful information. Therefore, the relationship between exploratory behaviors and the amount of information obtained should be strong, positive, but not perfect. Previous research suggests that when individuals explore further, they obtain more information relevant to their career-related needs (Stumpf et al., 1983b). During exploration the individual gathers information which is subsequently assessed to make a choice regarding organizational entry. The proposed causal sequence is that the more previous exploration activities, the higher level of information available at the decisional point. By exploring more and utilizing multiple sources (i.e., peers, professors, knowledgeable job incumbents), the

individual gathers more information, some of which converges to provide a more accurate information base.

Hypothesis 1: Environment exploration leads to obtaining and assimilating a greater amount of useful, career-relevant information.

The information obtained through exploration influences the development of one's expectations regarding organizations and jobs (Kotter, 1973; Wanous, 1980). By gathering more information through multiple sources, individuals are likely to identify areas of convergence or agreement. Such areas are likely to reflect more accurate information. Stumpf, Austin, and Hartman (1983a) found that the amount of information gathered is positively related to career-related outcomes, including recruiter ratings of interview performance and the generation of subsequent callback interviews. By obtaining more information, individuals are able to derive a more accurate view of the labor market positions and organizations, which leads to expectations regarding jobs and organizations that are more consistent with reality.

Hypothesis 2: Obtaining a greater amount of information about job opportunities and organizations is likely to result in expectations regarding the chosen job and organization that are more consistent with what one subsequently experiences.

In addition, the amount of information obtained through environment exploration provides a context for the comparison of alternatives. To the extent that one has put forth more effort and obtained a greater amount of information to evaluate alternatives, one is more likely to be committed to the choice, to experience dissonance reduction with respect to foregone alternatives (Vroom & Deci, 1971), and to be willing to expend effort for accepted organizational goals (Mowday & McDade, 1979).

Hypothesis 3: Putting forth effort to obtain a greater amount of information affects subsequent motivation to work in the chosen organization.

The development of realistic expectations regarding jobs and organizations will have an immediate positive benefit to the extent that they influence the individual's choice process. Realistic expectations are based on accurate knowledge about the job, which permits the individual to select an opportunity compatible with personal characteristics (e.g., values, interests, personality). Realistic expectations are considered distinct from met expectations—that is, the extent to which one's expectations (whether realistic or not) are met by the job and organization. Although some researchers view these concepts as synonymous (Greenhaus, Seidal, & Marinis, 1983), the extent to which expectations are based on accurate information is likely to affect choice; whereas whether or not one's expectations are met is a post-choice issue. Most of the research on realistic expectations has focused on the information organizations provide prior to choice (Wanous, 1980); therefore, the development and impact of realistic expectations is viewed primarily as a pre-choice concept. Because one's decision to join an organization is presumed to be a function of the perceived match between what

the individual wants and what the organization is offering (Wanous, 1980), realistic expectations regarding the organization and the job should result in a better person-job match (Feldman, 1981; London & Stumpf, 1982). Individuals accurately perceiving a "desirable situation" would tend to select it over situations accurately perceived as less desirable.

Hypothesis 4: Realistic expectations at the time of choice lead to a greater degree of person-job congruence.

Socialization

The match between individual values, interests, and skills, and organizational climates, work roles and goals is a central concept in the vocational adjustment and career development literatures (Holland, 1973; London & Stumpf, 1982; Schein, 1978). For example, Holland (1973) discusses the personality and interest fit between the individual and the demands of the chosen occupation. Extensive research on Holland's model generally supports the proposition that the degree of individual-occupation match is related to positive occupational adjustment (e.g., Garbin & Stover, 1980). Similarly, Schein (1978) discusses the match between an individual's motives, values, and abilities and his/her career path. Over time, an individual develops a career anchor, which becomes the stabilizing force in his/her career. Steers and Mowday (1981) also suggest that the extent to which an individual's expectations and values regarding a job are realized may be an important variable to consider in order to understand the turnover process.

In previous research the match between the individual's values and goals, and the work-role's demands—that is, attaining some degree of person-job congruence—has been shown: (1) to affect perceived influence in defining the work-role (Feldman, 1976); (2) to affect perceived competence and actual work performance (Kotter, 1973; Morse, 1975); (3) to relate to higher work satisfaction (Greenhaus et al., 1983; Kotter, 1973; Morse, 1975); and (4) to lead to higher work motivation (Stumpf, 1982).

Hypothesis 5: Achieving a greater degree of person-job congruence will result in more perceived influence in designing one's work-role, better perceived work performance, more work satisfaction, and greater work motivation.

In the initiation stage of socialization, Feldman (1981) suggests that the individual negotiates and defines his/her work role and relationships with others. A result of influencing one's work role is increased commitment to the organization (Mowday et al., 1982; Salancik, 1977). When one influences the choice of work to be performed, one is likely to select tasks one feels competent to address and to report more feelings of psychological success with respect to perceived work performance (Hall, 1976; Stumpf, 1981).

Hypothesis 6: Exerting more job-unit influence will result in greater organizational commitment and more feelings of effective work performance.

Following Hall's (1976) psychological success model, given job challenge, the individual's work motivation leads to greater goal commitment, attainment, and feelings of effective performance. In turn, feelings of psychological success lead to positive attitudes toward work (e.g., work satisfaction and job involvement).

Hypothesis 7: Motivation to perform leads to higher levels of perceived work performance, which subsequently leads to satisfaction with work.

Commitment or Withdrawal

Mowday et al. (1982) suggest positive relationships among early attitudinal commitment, job performance, and subsequent attitudinal commitment. They hypothesize that early commitment leads to improved job performance, which subsequently leads to higher levels of organizational commitment.

Hypothesis 8: Self perception of work performance is related to later feelings of organizational commitment.

Consistently, commitment to the organization has been found to relate negatively with concurrent and later intention to quit, as well as subsequent turnover (Mowday et al., 1982). Generally, highly committed employees intend to remain with the organization and to work towards organizational goals.

Hypothesis 9: Commitment to the organization leads to less intention to quit.

In addition, work satisfaction consistently has been found to relate negatively with concurrent and subsequent intention to quit and voluntary turnover (Mobley et al., 1978; Muchinsky & Tuttle, 1979).

Hypothesis 10: Work satisfaction negatively influences intention to quit.

As suggested by Steers and Mowday (1981) and others, the relationship between intention to quit and turnover may be influenced by prevailing economic conditions and the labor market. This suggests that intention to quit may lead to turnover in two ways. First, intention to quit may influence turnover directly (Mowday et al., 1982; Muchinsky & Tuttle, 1979); individuals may decide to withdraw with little exploration of the environment for alternative job opportunities. Presumably, this occurs more frequently under favorable labor market conditions. Second, intention to quit may influence turnover indirectly: individuals may reinitiate exploration activities in order to generate suitable, alternative job opportunities.

Hypothesis 11: Higher intention to quit is likely to influence turnover, with the strength of the relationship dependent on favorable labor market and economic conditions.

Finally, increased exploration of the environment to obtain career-related information often presents the individual with alternative opportunities, which increase the possibility of turnover (Mowday et al., 1982).

Hypothesis 12: Greater environment exploration leads to an increased likelihood of turnover.

The above hypotheses define the sequential stages of the process by which individuals learn about career opportunities, select and enter a work-role in an organization, either become committed to that organization or intend to withdraw, possibly reinitiate career exploration activities, and choose to leave or stay. Although the return to career exploration activities at a later time has been included, the model is based on an assumed, one-way causal sequence derived from theory. Possible feedback loops, which have been suggested by others (Steers & Mowday, 1981), are not included in the model so that this assumed, one-way causal sequence can be examined over time using path analysis. Measures were selected to minimize potential two-way causal relationships, as noted below.

Method

Sample and Procedure

A longitudinal design was used to examine the process from exploration activities to subsequent entry and socialization, and later turnover experiences. Data were collected at three points: career exploration data two to three months before organizational entry (denoted -1); entry and socialization data two to three months after organizational entry (denoted by -2) (Kramer, 1974); and withdrawal data eight to nine months after organizational entry (denoted by -3). The population included all individuals using the on-campus placement service of a large northeastern graduate school of business over an 18-month period. From more than 500 users, 157 were randomly identified and asked to participate at both time 1 and time 2 data collection points; 85 provided complete data at both points (54 percent response rate). Of these 85, 78 provided complete data at time 3.

This research was conducted at a time of relatively high unemployment (1981-1982), when even professionals and individuals completing graduate business programs were experiencing difficulty in obtaining suitable employment. For example, at the host university for this research, the percentage of students not yet employed two months after graduation had increased from 7 percent in 1979 to 31 percent in 1982. Similarly, the number of job offers reported by students dropped from 2.7 in 1979 to 1.4 ($SD = 1.41$) for this sample.

All participants in the sample held undergraduate degrees. Of the participants, 53 percent were female; the mean age was 28.4 years ($SD = 6.8$); 26 percent had one year of full-time work experience, 42 percent had 2 to 5 years of full-time work experience, and 10 percent had more than five years of full-time work experience. Of the participants, 17 percent were nondegree students involved in making a mid-life career change. Gender and age correlated near zero with the variables investigated. The largest

relationships were between gender (coded 0 for males, 1 for females) and environment exploration ($r = .12$, ns), and between age and realistic expectations ($r = .19$, $p \leq .05$).

Time 1 data were collected using the career exploration survey (CES) as part of routine career placement activities (Stumpf et al., 1983b). Time 2 data were collected via a mail questionnaire with two follow-up attempts for nonrespondents. There were 22 individuals who could not be reached by mail; 9 individuals had not obtained a job. Time 3 data also used a mail questionnaire with two follow-up attempts (one person could not be reached).

Measures

Individual Career Exploration—Time 1. Two CES dimensions were used to measure the individual's career exploration behaviors at time 1: environment exploration (i.e., the extent of career exploration regarding occupations, jobs, and organizations within the last three months); and amount of information (i.e., the amount of information acquired on occupations, jobs, organizations, and oneself). The environment exploration scale included six items with 5-point Likert response scales. Each item focused the individual's attention on exploration during the previous three months; exemplary items include: "initiated conversations with knowledgeable individuals in my career area," and "obtained information on the labor market and general job opportunities in my career area." The amount of information scale included three items with 5-point response scales. Exemplary items are: "I currently have a moderate amount of information on how I'll fit into various career paths" (coded 1) to "I have thoroughly explored myself and know what to seek and what to avoid in developing a career path" (coded 5). These scales, their response formats, and reliability and validity data are reported in detail by Stumpf et al. (1983b).

Organizational Entry and Socialization—Time 2. Two multi-item scales developed by Feldman (1976) were used to measure the organization entry variables: realistic expectations (i.e., the extent to which one "knew the good points and bad points of the job at the time of hire"); and person-job congruence (i.e., "I feel like this is not the right type of work for me," or "I'm not the right type of person for this job," reverse coded). These scales include three items and two items respectively, have 7-point Likert scales, and exhibit acceptable psychometric properties (Feldman, 1976). The time 2 questionnaire included a retrospective assessment of the employee's initial expectations, following Dunnette, Arvey, and Banas (1973) and Feldman (1976).

Six scales were used to assess the organizational socialization process and its attitudinal outcomes. Job-unit influence (i.e., the extent to which one feels that one "influences aspects of the job and the work unit") and work motivation (i.e., the extent to which one feels inspired to work) are both measured by multi-item scales (two items and four items respectively) with

a 7-point Likert response format after Feldman (1976). Perceived work performance (i.e., one's self-evaluation of task mastery and job performance) is measured by a 6-item scale with a 6-point Likert response format after Hall and Hall (1976). Work satisfaction is measured by a 7-item subscale of the Job Descriptive Index (JDI) with a 3-point response format (Smith, Kendall, & Hulin, 1969). Of the 18 JDI items, 7 were randomly selected for this research. Organizational commitment (i.e., feelings of commitment and loyalty to the organization) was measured by a 15-item scale with a 7-point Likert response format after Mowday et al. (1979). Items in the Mowday et al. scale regarding intention to quit were not used. Intention to quit was measured by a 2-item scale with a 5-point Likert response format after Mobley et al. (1978). Only the items that focused on intention to quit, rather than exploration of labor market conditions, were used.

Withdrawal—Time 3. Three variables were used to measure withdrawal behaviors: environment exploration (using the previously mentioned CES 6-item scale); intention to quit one's present organization or job (measured as noted above); and turnover (e.g., "Are you still working for the same organization and unit that you started at upon completing your most recent educational program?").

Intention to quit-3 was collected as a proxy for turnover in the event that less than 10 percent of the participants had withdrawn from the initial employer. In this case, the research design called for using intention to quit-3 in the path model and deleting turnover because of lack of variance. In the event of greater than 10 percent turnover, intention to quit-2 and turnover-3 would be used in the path analysis, and intention to quit-3 deleted. (Note that intention to quit-3 and turnover-3 could not be used together because of the obvious problem of asking someone if they intended to quit after they had actually left the organization.)

The turnover question was open-ended and requested that the current employer, position, and reason for leaving be noted: 15 individuals had changed organizations; two had changed work units and referred to these changes as opportunities the organization had offered to prevent their leaving; and three people had changed units as part of the formal career progression. The latter three were treated as having maintained employment with their initial employer (i.e., they did not turnover). All respondents indicated that they had left their initial employer or unit voluntarily.

Table 1 presents the means, standard deviations, correlations, and scale reliabilities for each variable studied. Coefficient alpha reliability estimates for each scale are shown along the main diagonal and range from .71 to .94.

Analysis

Path analysis was used to analyze the chain of predicted relationships simultaneously and to identify indirect effects of one variable on another via intervening variables (Kerlinger & Pedhazur, 1973). The use of path analysis requires several assumptions beyond those required for multiple

Table 1
Means, Standard Deviations, Correlations, and Scale Reliabilities
($N=85$)

Variables	Mean	SD	Correlations ^a											
			1	2	3	4	5	6	7	8	9	10	11	12
1. Environment exploration-1	3.45	.83	(88)											
2. Amount of information-1	3.70	.62	.52**	(79)										
3. Realistic expectations-2	4.57	1.58	.16	.37**	(90)									
4. Person-job congruence-2	4.82	1.60	.12	.30**	.48**	(73)								
5. Work motivation-2	5.85	.88	.10	.34**	.30**	.43**	(71)							
6. Job-unit influence-2	4.38	1.55	.07	.02	.27**	.46**	.16	(83)						
7. Perceived work performance-2	4.26	.92	.06	.24*	.46**	.67**	.49**	.51**	(85)					
8. Work satisfaction-2	2.49	.73	.10	.19	.38**	.71**	.48**	.47**	.72**	(81)				
9. Organizational commitment-2	4.88	1.19	-.14	.04	.32**	.42**	.35**	.45**	.62**	.40**	(93)			
10. Intention to quit-2	2.25	1.23	.00	-.06	-.31**	-.48**	-.35**	-.39**	-.54**	-.56**	-.69**	(90)		
11. Environment exploration-3	2.63	1.28	.24*	.17	.06	-.04	-.09	-.10	-.08	-.11	-.21*	.22*	(94)	
12. Turnover-3	.22	.42	-.07	-.16	-.24*	-.20*	-.18	-.15	-.20*	-.21*	-.09	.23*	.42**	(-)

^aDecimals omitted. Numbers in parentheses are coefficient alpha estimates of reliability.

* $p \leq .05$ (two-tailed)

** $p \leq .01$ (two-tailed)



regression analysis. (Multiple regression assumptions include interval-scale measurement, homoscedasticity, no multicollinearity, linear and additive effects among variables, and uncorrelated residuals.) Additional assumptions for path analysis as applied here are: (1) a clearly defined causal system, (2) one-way causation, (3) a high degree of measurement reliability and validity, and (4) a structural system of variables whereby a change in one variable is a linear function of changes in other variables (Feldman, 1975).

It is believed that assumptions one and two are reasonably met. Figure 1 makes explicit a causal system based on theory and previous research. Although reciprocal causation is possible within a time period, the wording of the questions used often directed the participant's attention to a prior behavior or cognitive state. For example, the environment exploration questions focused on exploration over the past three months; the amount of information variable addressed information obtained at the time the questionnaire was completed. Similarly, realistic expectation questions focused on the time of hire; person-job congruence addressed congruence after some period of work activity; and job-unit influence and work motivation addressed the cumulative socialization process.

Assumption three is reasonable, given the psychometric data presented and past psychometric data reported on the instruments used. Assumption four is the most questionable, given the unmeasured variables problem identified by James (1980). However, the model examined reflects the primary variables identified in the literature for which there are psychometrically sound measures available. The failure of the variables and model to meet these assumptions could lead to erroneous results. Cross-validation and replication studies are needed to address empirically possible assumption violations.

The 18 relationships identified as Hypotheses 1 through 12 in Figure 1 and shown in Figure 2 were path analyzed. Structural equations were generated based on the 12 hypotheses. Path coefficients then were determined for each hypothesized path by calculating the appropriate partial regression coefficients as shown in Exhibit 1. The betas generated through regression analyses are shown as the direct effect in Table 2.

Exhibit 1 Partial Regression Coefficients^a

$P_{21} = \text{beta}_{21} = r_{12}$	(1)	$P_{84} = \text{beta}_{84.765432}$	(10)
$P_{32} = \text{beta}_{32} = r_{23}$	(2)	$P_{87} = \text{beta}_{87.65432}$	(11)
$P_{43} = \text{beta}_{43} = r_{34}$	(3)	$P_{96} = \text{beta}_{96.75432}$	(12)
$P_{52} = \text{beta}_{52.43}$	(4)	$P_{97} = \text{beta}_{97.65432}$	(13)
$P_{54} = \text{beta}_{54.32}$	(5)	$P_{10,8} = \text{beta}_{10,8.9765432}$	(14)
$P_{64} = \text{beta}_{64} = r_{46}$	(6)	$P_{10,9} = \text{beta}_{10,9.8765432}$	(15)
$P_{74} = \text{beta}_{74.6532}$	(7)	$P_{11,10} = \text{beta}_{11,10} = r_{10,11}$	(16)
$P_{75} = \text{beta}_{75.6432}$	(8)	$P_{12,10} = \text{beta}_{12,10.11}$	(17)
$P_{76} = \text{beta}_{76.5432}$	(9)	$P_{12,11} = \text{beta}_{12,11.10}$	(18)

^aThe first numeral subscript on each beta is the dependent variable, the second numeral subscript is the independent variable of relevance to the path, and the numerals following the period are partialled from the dependent variable.

The 48 paths between variables that are not designated by an arrow on the path diagram were presumed to be nonsignificant and near zero (Blalock, 1962). Appropriate partial betas were computed to determine if these path coefficients were, in fact, near zero (see Table 3). Finally, the residual of each endogenous variable in the path model was calculated by subtracting from the variable its predicted self based on the path model. The correlations of these residuals should be near zero (James, 1980), which, in fact, they were ($|r|$'s ranged from .00 to .14).

Results

Process of Becoming Committed to an Organization

Direct Linkages. The 12 hypotheses presented in Figure 1 identify 18 direct linkages among the 12 variables. These hypotheses received general support and are discussed below. As previously noted, the model implies that the remaining 48 direct relationships among variables are expected to be nonsignificant and near zero in magnitude. Of these relationships, 45 were nonsignificant and ranged from $-.18$ to $+.18$.

Figure 2 and Table 2 present the standardized path coefficients (i.e., equations 1 to 18) for the 12 hypothesized relationships. Environment exploration was a strong, significant predictor of the amount of information gathered by the individual ($P_{21} = .52$). The hypothesized relationships between the preentry and entry variables also were supported. Amount of information was a significant predictor of both realistic expectations ($P_{32} = .36$) and work motivation ($P_{52} = .21$).

The hypotheses among entry and early socialization variables were all supported. Realistic expectations was a strong, significant predictor of person-job congruence ($P_{43} = .48$). In turn, person-job congruence was a moderately significant predictor of work motivation ($P_{54} = .33$), job-unit influence ($P_{64} = .46$), perceived work performance ($P_{74} = .37$), and work satisfaction ($P_{84} = .36$).

In addition, work motivation related significantly with perceived work performance ($P_{75} = .25$), and job-unit influence was a significant predictor of perceived work performance ($P_{76} = .24$) and organizational commitment ($P_{96} = .19$). In turn, perceived work performance was a strong, positive, and significant predictor of both work satisfaction ($P_{87} = .40$) and organizational commitment ($P_{97} = .48$). Work satisfaction and organizational commitment were both negative, significant predictors of intention to quit-2 ($P_{10,8} = -.38$ and $P_{10,9} = -.59$, respectively). Finally, intention to quit-2 exhibited a significant effect with environment exploration-3 as hypothesized ($P_{11,10} = .22$), but not with turnover ($P_{12,10} = .14$; ns). Environment exploration-3 was strongly related to turnover-3 ($P_{12,11} = .42$). Given the nonsignificance of the intention to quit-2 with turnover-3 relationship, it was trimmed from the final path model shown in Figure 2.

Other Linkages Implied by the Model. Table 2 presents the three "effects" implied by a path diagram: direct causal effects, indirect causal

Table 2
Summary of Effects Hypothesized in
the Organizational Commitment Path Model

<i>Relation</i>	<i>Direct Effect</i>	<i>Indirect Effect</i>	<i>Common Cause</i>	<i>r</i>	<i>Unexplained^a</i>
Environment exploration-1 with amount of information-1	.52**	.00	.00	.52**	.00
Amount of information-1 with realistic expectations-2	.36**	.00	.00	.37**	.01
Amount of information-1 with work motivation-2	.21*	.06	.00	.34**	.07
Realistic expectations-2 with person-job congruence-2	.48**	.00	.00	.48**	.00
Person-job congruence-2 with work motivation-2	.33**	.00	.04	.43**	.06
Person-job congruence-2 with job-unit influence-2	.46**	.00	.00	.46**	.00
Person-job congruence-2 with perceived work performance-2	.37**	.19	.01	.67**	.10
Person-job congruence-2 with work satisfaction-2	.36**	.22	.01	.71**	.12
Work motivation-2 with perceived work performance-2	.25**	.00	.17	.49**	.07
Job-unit influence-2 with perceived work performance-2	.24*	.00	-.21	.51**	.06
Job-unit influence-2 with organizational commitment-2	.19*	.12	.10	.45**	.04
Perceived work performance-2 with work satisfaction-2	.40**	.00	.17	.72**	.15
Perceived work performance-2 with organizational commitment-2	.48**	.00	.10	.62**	.04
Work satisfaction-2 with intention to quit-2	-.38**	.00	-.20	-.56**	.02
Organizational commitment-2 with intention to quit-2	-.59**	.00	-.10	-.69**	.00
Intention to quit-2 with environment exploration-3	.22**	.00	.00	.22*	.00
Intention to quit-2 with turnover-3	.14	.09	.00	.23*	.14
Environment exploration-3 with turnover-3	.42**	.00	.00	.42**	.00

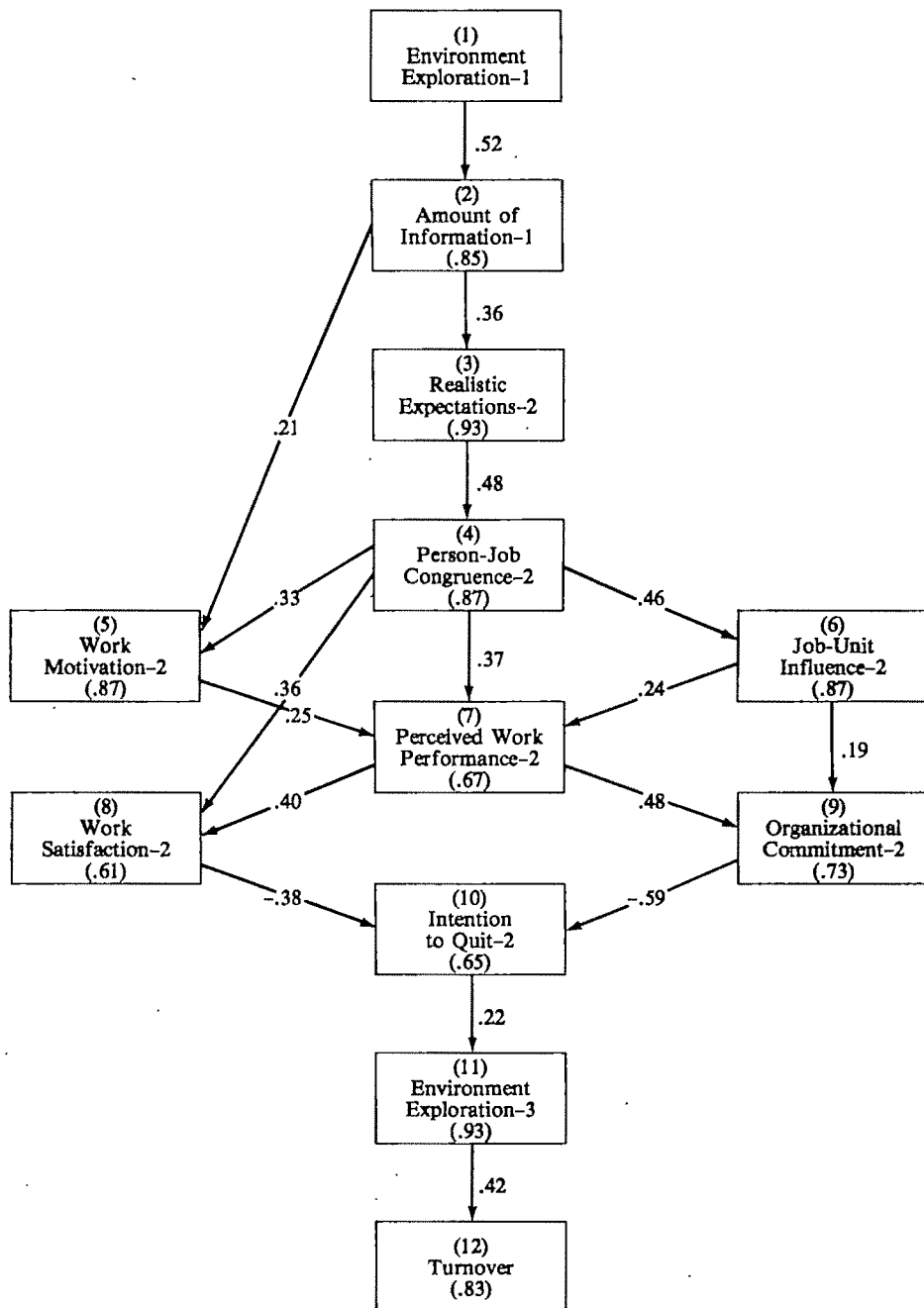
^aThe unexplained effect is the difference between the simple *r* and the sum of the direct, indirect, and common cause effects. The direct effects are the betas defined by equations 1 through 18.

**p* ≤ .05

***p* ≤ .01

effects, and common cause effects (Kerlinger & Pedhazur, 1973). A direct causal effect is the impact of a variable presumed to be a cause of another variable; it is a standardized regression coefficient (beta), as shown in Figure 2. An indirect causal effect represents those effects interpreted by the intervening variables; it is the product of the path coefficients along an indirect route from cause to effect via tracing arrows in the headed direction only. When more than one indirect path exists, the total indirect effect is their sum. The common cause effect indexes the amount of spurious covariation between two variables caused by other prior variables in the model. It is the product of the path coefficients along both "legs" of the common cause effect. If there is more than one common cause variable, the total common cause effect is their sum. (For example, the common cause of the

Figure 2
A Path Analysis of the Process
of Becoming Committed to an Organization^a



^aStandardized path coefficients (β) are reported; all are significant at or below the .05 level.

relationship between work motivation and person-job congruence is amount of information. The common cause effect is $P_{52} \times P_{43} \times P_{32}$ or $.21 \times .48 \times .36 = .04$). The effects not explained by the path model—the residuals of the simple correlation coefficients once all *implied* effects are removed—should be near zero if the path model efficiently captures the relationships in the data.

Five indirect effects are large and noteworthy. Realistic expectations indirectly affect: perceived work performance through person-job congruence, work motivation, and job-unit influence (indirect effect = .27), and work satisfaction through person-job congruence, work motivation, job-unit influence, perceived work performance, and work satisfaction (indirect effect = .28). These indirect effects imply that the impact of realistic expectations on perceived work performance and work satisfaction is best captured by a process that involves not only choosing a job that is both congruent with one's skills and interests, but also feeling some influence on that job.

Person-job congruence has a large indirect effect on organizational commitment via work motivation, job-unit influence, and perceived work performance (indirect effect = .36). This indirect effect suggests that the importance of person-job congruence on the work outcome variable of organizational commitment is represented by the attitudinal developments of perceived job-unit influence, feelings of work motivation, and perceived work performance.

Person-job congruence also indirectly affects intention to quit via the intervening variables of work motivation, job-unit influence, perceived work performance, work satisfaction, and organizational commitment (indirect effect = -.43). Perceived work performance indirectly affects intention to quit via work satisfaction and organizational commitment (indirect effect = -.43). Both these indirect effects suggest the psychological processes by which intention to quit is formed by the individual after entering an organization.

The two large common cause effects (job-unit influence with work satisfaction, .30, and work satisfaction with organizational commitment, .34) indicate that the simple correlations between these constructs are due largely to other, causally prior variables. Person-job congruence is the major common cause of the large correlation between job-unit influence and work satisfaction ($r = .47$). Similarly, perceived work performance is the major common cause of the large correlation between work satisfaction and organizational commitment ($r = .40$).

The effects hypothesized but not explained by the model are generally small, as shown in Table 2. Among the 48 implied to be zero effects (Table 3), 4 are large enough to note: environment exploration-1 with organizational commitment-2, -.19; environment exploration-1 with environment exploration-3, .25; amount of information-1 with environment exploration-3, .19; and realistic expectations-2 with turnover-3, -.21. These unexplained effects parallel the somewhat larger than expected direct effects

Table 3
Summary of Effects Implied to Be Zero
in the Organizational Commitment Path Model^a

<i>Path</i>	<i>Beta</i>	<i>Direct Effect</i>	<i>Indirect Effect</i>	<i>Common Cause</i>	<i>r</i>	<i>Unexplained^b</i>
<i>P</i> ₃₁	beta _{31,2}	-.11	.19	.00	.16	-.03
<i>P</i> ₄₁	beta _{41,23}	-.02	.09	.00	.12	.03
<i>P</i> ₅₁	beta _{51,234}	-.10	.14	.00	.10	-.04
<i>P</i> ₆₁	beta _{61,234}	.12	.04	.00	.07	.03
<i>P</i> ₇₁	beta _{71,23456}	.07	.08	.00	.06	-.02
<i>P</i> ₈₁	beta _{81,234567}	.06	.03	.00	.10	.07
<i>P</i> ₉₁	beta _{91,234567}	-.18*	.05	.00	-.14	-.19
<i>P</i> _{10,1}	beta _{10,1,23456789}	-.09	-.04	.00	.00	.04
<i>P</i> _{11,1}	beta _{11,1,23456789,10}	.18	-.01	.00	.24*	.25
<i>P</i> _{12,1}	beta _{12,1,23456789,10,11}	-.03	-.01	.00	-.07	-.06
<i>P</i> ₄₂	beta _{42,3}	.14	.17	.00	.30**	.13
<i>P</i> ₆₂	beta _{62,34}	-.10	.08	.00	.02	-.06
<i>P</i> ₇₂	beta _{72,3456}	-.02	-.15	.00	.24*	.09
<i>P</i> ₈₂	beta _{82,34567}	-.05	.17	.00	.19	.02
<i>P</i> ₉₂	beta _{92,34567}	-.14	.09	.00	.04	-.05
<i>P</i> _{10,2}	beta _{10,2,3456789}	.03	-.10	.00	-.06	.04
<i>P</i> _{11,2}	beta _{11,2,3456789,10}	.18	-.02	.00	.17	.19
<i>P</i> _{12,2}	beta _{12,2,3456789,10,11}	-.15	-.01	.00	-.16	-.15
<i>P</i> ₅₃	beta _{53,24}	.07	.16	.08	.30**	.06
<i>P</i> ₆₃	beta _{63,4}	.10	.22	.00	.27**	.05
<i>P</i> ₇₃	beta _{73,2456}	.15	.27	.02	.46**	.17
<i>P</i> ₈₃	beta _{83,24567}	-.02	.28	.01	.38**	.09
<i>P</i> ₉₃	beta _{93,24567}	.08	.17	.01	.32**	.14
<i>P</i> _{10,3}	beta _{10,3,2456789}	-.03	-.21	-.01	-.31**	-.09
<i>P</i> _{11,3}	beta _{11,3,2456789,10}	.10	-.04	-.01	.06	.11
<i>P</i> _{12,3}	beta _{12,3,2456789,10,11}	-.22*	-.02	-.01	-.24*	-.21
<i>P</i> ₉₄	beta _{94,23567}	-.04	.36	.01	.42**	.05
<i>P</i> _{10,4}	beta _{10,4,2356789}	-.06	-.43	-.01	-.48**	-.04
<i>P</i> _{11,4}	beta _{11,4,2356789,10}	.05	-.09	-.01	.04	.14
<i>P</i> _{12,4}	beta _{12,4,2356789,10,11}	.04	-.04	-.01	-.20*	-.15
<i>P</i> ₆₅	beta _{65,234}	-.02	.00	.17	.16	-.01
<i>P</i> ₈₅	beta _{85,23467}	.14	.10	.20	.48**	.18
<i>P</i> ₉₅	beta _{95,23467}	.13	.12	.16	.35**	.07
<i>P</i> _{10,5}	beta _{10,5,2346789}	-.01	-.11	-.15	-.35**	-.09
<i>P</i> _{11,5}	beta _{11,5,2346789,10}	-.11	-.02	-.03	-.09	-.04
<i>P</i> _{12,5}	beta _{12,5,2346789,10,11}	-.03	-.01	-.02	-.18	-.15
<i>P</i> ₈₆	beta _{86,23457}	.07	.10	.30	.47**	.07
<i>P</i> _{10,6}	beta _{10,6,2345789}	.01	-.22	-.18	-.39**	.01
<i>P</i> _{11,6}	beta _{11,6,2345789,10}	-.02	-.05	-.04	-.10	-.01
<i>P</i> _{12,6}	beta _{12,6,2345789,10,11}	-.09	-.02	-.02	-.15	-.11
<i>P</i> _{10,7}	beta _{10,7,2345689}	.14	-.43	-.13	-.54**	.02
<i>P</i> _{11,7}	beta _{11,7,2345689,10}	.03	-.09	-.03	-.08	.04
<i>P</i> _{12,7}	beta _{12,7,2345689,10,11}	-.08	-.04	-.01	-.20*	-.15
<i>P</i> ₉₈	beta _{98,234567}	-.10	.00	.34	.40**	.06
<i>P</i> _{11,8}	beta _{11,8,2345679,10}	-.03	-.08	-.04	-.11	.01
<i>P</i> _{12,8}	beta _{12,8,2345679,10,11}	.01	-.04	-.02	-.21*	-.15
<i>P</i> _{11,9}	beta _{11,9,2345678,10}	-.12	-.13	-.02	-.21*	-.06
<i>P</i> _{12,9}	beta _{12,9,2345678,10,11}	.31*	-.05	-.01	-.09	-.03

^aThe first numeral subscript on each beta is the dependent variable, the second numeral subscript is the independent variable of relevance to the path, and the numerals following the period are partialled from the dependent variable.

^bThe unexplained effect is the difference between the simple *r* and the sum of the direct, indirect, and common cause effects. For each relationship, the direct effect was implied to be zero; the unexplained effect does *not* include the direct effect.

**p* ≤ .05

***p* ≤ .01

implied to be zero in Figure 1 and shown in Table 3: the direct link of environment exploration with organizational commitment ($P_{91} = -.18, p \leq .05$); the direct link of realistic expectations with turnover ($P_{12,3} = -.22, p \leq .05$); and the direct link of organizational commitment with turnover ($P_{12,9} = .31, p \leq .05$). These effects suggest that a direct relationship between career exploration variables and work outcome variables may be strong enough to warrant further investigation. These relationships were not hypothesized in this study, and they are not included in the path model.

Discussion

Moderate support was found for a process model of becoming committed to an organization and subsequent turnover based on data collected at three different times and analyzed using a structural equations model derived from existing theory and empirical findings regarding various aspects of the process. Although causation cannot be inferred based on either the longitudinal design or the path analysis conducted, the data generally are consistent with the proposed causal model. One hypothesized relationship was not observed (intention to quit with turnover eight to nine months later), and three direct effects not hypothesized were significant.

The direct examination of environment exploration activities as influencing the organizational entry and initial socialization processes supports current theory (Mowday et al., 1982; Steers & Mowday, 1981). Because the examination of environment exploration as a mediating variable between intention to quit and turnover also received support, the results suggest that the individual's career management and exploration activities outside the work setting both prior to and after organizational entry are central to understanding the processes prior to organizational commitment or withdrawal (London & Stumpf, 1982; Stumpf et al., 1983b).

The organizational entry process received support within the general model proposed. The relationships of information with realistic expectations and realistic expectations with person-job congruence support the organizational entry process suggested by Wanous (1980). Obtaining a greater amount of information leads to the perception of having more accurate information on which to establish job expectations and to choose an organization. A direct link between realistic expectations and work satisfaction was not observed, given the intervening effect of person-job congruence. This is consistent with the findings of Greenhaus et al. (1983) that value attainment on the job more strongly predicts satisfaction than do expectations and that the unmet expectation to satisfaction relationship is near zero once value attainment is held constant.

Several of Feldman's (1976, 1981) proposed linkages between anticipatory socialization and subsequent socialization processes and outcomes were supported. Person-job congruence appears to be a central, intervening factor in the organizational entry \rightarrow socialization process. The extent to which the person and job are perceived as compatible is an important common cause

of several relationships, including work motivation with perceived work performance, job-unit influence with perceived work performance, and organizational commitment with work satisfaction. Many of the moderate to large correlations typically observed among work attitudes may be due partially to the positive effect associated with the feeling that one is in the "right" job.

The portion of Hall's (1976) psychological success model investigated also received support: work motivation \rightarrow perceived work performance (psychological success) \rightarrow work satisfaction. The direct linkage of work motivation to work satisfaction ($r = .48$) shrank to a nonsignificant path coefficient of .18, which is consistent with Hall's single cause-single effect model. Although Hall's model hypothesizes the indirect effect via perceived work performance, the model proposed herein suggests a common cause effect due to person-job congruence. Given that the latter common cause effect was twice the size of the indirect effect (.20 vs .10), it seems useful to examine Hall's model in the context of a general process of becoming committed to an organization or withdrawing.

Intention to quit was hypothesized and found to be the direct result of two variables: organizational commitment and work satisfaction. Perceived work performance, work motivation, job-unit influence, and person-job congruence each had a moderate to strong correlation with intention to quit (r 's = $-.54$, $-.35$, $-.39$, $-.48$), but these relationships shrank to near zero once various socialization process variables were examined. The indirect effects—particularly with respect to perceived work performance and person-job congruence—suggest that it is the outcomes of the feelings about work performance (commitment and satisfaction) as well as being in a job and organization that suits one's values and goals (via job-unit influence and work motivation) that affect intentions to quit or stay.

Although no direct path relationship between organizational commitment and turnover was hypothesized, the correlation between these variables was expected to be negative and significant. The observed, nonsignificant relationship between organizational commitment and turnover ($r = -.09$, ns) is counter to the results of eight studies on the commitment-turnover relationship reviewed by Mowday et al. (1982). The results of the eight studies Mowday et al. reviewed show a significant inverse relationship between organizational commitment and turnover in both cross-sectional and longitudinal research designs with a variety of samples. The lack of a significant relationship here may reflect some of the constraints upon turnover imposed by economic and labor market conditions at the time of this study. Although some individuals were not committed to the organization, they may have chosen to remain longer because of the lack of available, alternative opportunities. It is likely to be through the reinitiation of environment exploration that organizational commitment influences subsequent turnover in situations of high unemployment.

The relationship between organizational commitment and turnover, which was implied to be zero, was found to be substantial and positive

($P_{12,10} = .31, p \leq .05$). Once the intervening effects of intention to quit and environment exploration and the common cause effects of variables preceding organizational commitment in the model are held constant, organizational commitment was positively related to turnover. Several effects observed help to explain this unexpected result. Specifically, certain individuals may have a general predisposition to explore (e.g., Holland's investigative personality type), independent of current work attitudes. To the extent that their exploration leads to new job opportunities, they may leave their organization for a better job offer. Some support for this explanation is found in the correlation of .24 ($p \leq .05$) between preentry environment exploration and environment exploration a year later. A related explanation is that greater environment exploration prior to choice provides one with a more accurate view of what is available, even if specific job offers are not made at that time. The contacts developed while exploring may result in actual job offers several months after one has accepted employment, which may precipitate turnover.

The negative and significant direct effect between environment exploration and organizational commitment ($P_{91} = -.18, p \leq .05$, not hypothesized) also suggests that exploration may affect the turnover process in subtle, complex ways. Those who explore more prior to choice are less committed to the organization when the intervening effects of entry and socialization are held constant. Although environment exploration has a positive indirect effect on organizational commitment based on the choice and socialization process, the overall effect for the organization may be negative.

Finally, the significant correlation ($r = -.24$) and direct effect between realistic expectations and turnover ($P_{12,3} = -.22$) suggest that developing expectations that parallel reality—even if they are not specifically met—may reduce turnover. Individuals with purportedly valid information may view organizational events that lead to unmet expectations as exceptions due to immediate local conditions, and they may not necessarily develop negative attitudes towards the organization. For example, at entry one may accurately expect to receive a salary increase after six months. However, local conditions six months later may result in no salary increase (e.g., lower than expected performance or a corporate-wide salary freeze). The individual's expectations would not be met, but they would still be considered realistic at the time of entry. The individual's attitude toward the organization would not necessarily be lowered because of these unmet expectations.

Several limitations of this study should be noted. First, the data were collected via self-report instruments, which increases the possible presence of method and social desirability biases. The collection of objective measures of career exploration activities and on-the-job behaviors (e.g., job performance) would provide additional validity data.

Second, the model does not include nonwork factors (e.g., marital status, employment of spouse, geographical constraints) that may influence the career exploration activities, organizational entry processes, or a turnover

decision (Steers & Mowday, 1981). Future research should attempt to examine such variables to determine their effect on the turnover process.

Third, the sample size is less than desired because of the attrition of subjects across the three time periods. However, the statistical power of the statistical tests used is above .70 for most betas, and the significance level is .01 for most hypothesized relationships.

Fourth, because of the one-way causal sequence proposed, feedback loops were not included. Others (Steers & Mowday, 1981) have suggested that feedback loops may be important to an understanding of the commitment or turnover process. Future research should address this issue in an alternative analytic framework that does not assume a one-way causal model.

Future research also should address exploration aspects of job search and how the information acquired affects choice, socialization, and commitment or turnover processes for populations other than new college or graduate school hires; for example, individuals entering trade or craft jobs or individuals making job changes within an industry. Until additional field and experimental research supports a general causal model, the results herein are best viewed as a framework for examining the processes leading to becoming committed to an organization or deciding to leave it.

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Sources and Outcomes of Stress in Organizational Settings: Toward the Development of a Structural Model¹

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An integrated structural model of stress in organizations was developed and tested through path analysis. Results provided qualified support for the causal assumptions underlying the model. Role frustration and short lead times were found to be potent stressors. Felt stress and low organizational commitment independently contributed to voluntary turnover.

Recent reviews of the stress literature (Beehr & Newman, 1978; Beehr & Schuler, 1982; Van Sell, Brief, & Schuler, 1981) indicate that few studies have examined the multivariate linkages among the causes and consequences of stress in organizational settings (for exceptions, see House and Rizzo, 1972; Miles and Perreault, 1976). Furthermore, only limited attention has been devoted (Bedeian & Armenakis, 1981; Miles, 1964) to assessing empirically the causal relationships among sets of organizational, task, role, and individual variables posited in theoretical models of stress (Beehr & Newman, 1978; Caplan, Cobb, French, Harrison, & Pinneau, 1975; Cooper & Marshall, 1976; Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964; McGrath, 1976). The purpose of the present study, therefore, is to develop a preliminary structural model of stress, its antecedents and outcomes, and test the linkages specified in the model through path analysis.

In formulating the proposed structural model, the study went beyond the theoretical perspectives provided in the Kahn et al. (1964) model and incorporated important elements from recent conceptualizations of stress (Beehr & Newman, 1978; Beehr & Schuler, 1982; Caplan et al., 1975;

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McGrath, 1976; Van Sell et al., 1981). Building on McGrath's (1976) proposition that stress in organizations originates from the behavior setting, tasks, and roles, as well as characteristics of the "person system," the model includes contextual, role-related, and personal variables as antecedent conditions potentially influencing job stressors.

Variables

Contextual

Recent studies (Adams, Laker, & Hulin, 1977; Parasuraman & Alutto, 1981) have provided empirical support for the proposition that the behavior setting or sector of organizational space in which individuals are located provides a contextual basis for differential interpretations of or "meaning" ascribed to system events (Katz & Kahn, 1966; McGrath, 1976). Hence the concept of subsystem, reflecting the horizontal differentiation of organizational space, was included as a primary contextual variable capable of influencing perceptions of stressors and stress reactions. Insofar as assignment to different work schedules forces separation of workers, it represents another source of differential work experiences and perceptions (Parasuraman & Alutto, 1981). Thus work shift, which captures the temporal dimension of separation in terms of organizational space, represented another salient contextual variable of interest.

Role-Related

Katz and Kahn (1966) and McGrath (1976) posited that various aspects of organizational roles could influence individuals' work experiences and reactions. Among the variables found to be related to individuals' stress perceptions and their responses are: organizational level (Kahn et al., 1964; Parasuraman & Alutto, 1981; Van Sell et al., 1981); supportive leadership practices (Caplan et al., 1975; House & Rizzo, 1972); and task characteristics (Brief & Aldag, 1976; Hall & Lawler, 1970; Parasuraman & Alutto, 1981; Schuler, 1977). Thus the set of role-related variables examined in this study included job level, reflecting the vertical differentiation of roles; leadership attention, representing supportive leadership; and five task characteristics: autonomy, closeness of supervision, complexity, interdependence, and routinization.

Personal

Beehr and Newman (1978) and Van Sell et al. (1981), among others, have emphasized the role of personal characteristics in influencing both the focal person's perceptions of stressors as well as reactions to them. Based on previous findings and/or suggestions, three personality or quasi-personality dimensions were examined to assess the differential sensitivity of individuals

to stress situations. They were locus of control (Beehr & Newman, 1978; Beehr & Schuler, 1982); trait anxiety (McGrath, 1970; Spielberger, 1966); and job involvement (Weissenberg & Gruenfeld, 1968). Additionally, age, sex, educational level, and organizational tenure were included as relevant demographic characteristics (Alutto, Hrebiniak, & Alonso, 1970; Beehr & Schuler, 1982; Indik, Seashore, & Slesinger, 1964; Rizzo, House, & Lirtzman, 1970).

Job Stressors

In this paper, job stressors were viewed as situational factors potentially capable of producing stress reactions. Following Parasuraman and Alutto (1981), stressors were defined conceptually as job demands, constraints (or opportunities), and job-related events or situations that may affect an individual's role fulfillment. As such they constitute potential sources of felt stress. Thus it was recognized that situations are not in themselves "stressful," but they may be so, depending on how individuals "receive" the demand and the meaning that they attribute to the situation. Based on the research of Parasuraman and Alutto (1981), seven situational stressors were investigated in this study: interunit conflict; technical problems; efficiency problems; role frustration; staff shortages; short lead times; and too many meetings.

Attitudinal Outcomes

Felt stress was examined as the primary psychological response of individuals to job stressors. Felt stress was defined conceptually as the psychological response state of disturbed affect experienced by an individual in relation to various job demands or constraints encountered in the work environment. The experience of stress has been found to influence the focal individual's level of job satisfaction and commitment to the organization (Bedeian & Armenakis, 1981; Beehr & Newman, 1978; Hrebiniak & Alutto, 1972; Van Sell et al., 1981). Hence job satisfaction and organizational commitment were investigated as second level attitudinal outcomes of importance.

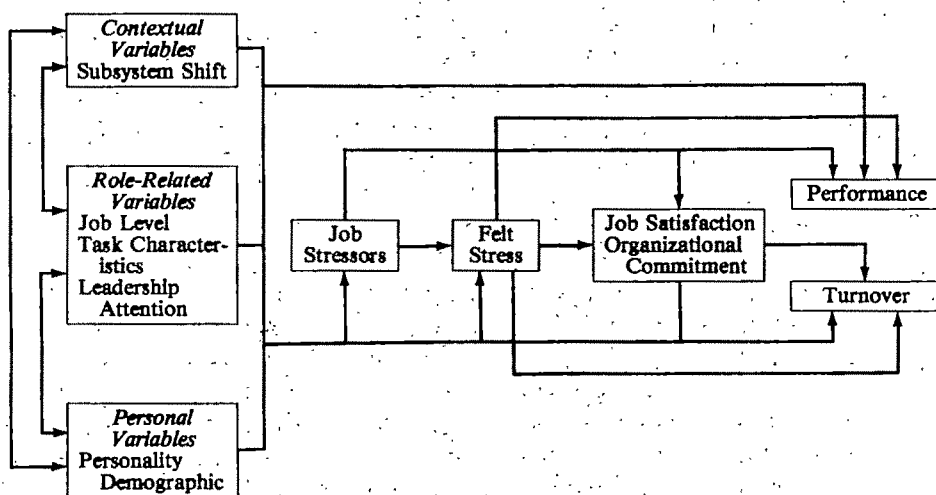
Behavioral Outcomes

It is generally believed that stress impairs performance, but the evidence provided by field studies (Buck, 1972; Hall & Lawler, 1970; Sheridan & Vredenburgh, 1979) is both sparse and mixed. Some researchers have reported that job stressors and experienced stress are related to turnover (Brief & Aldag, 1976; Gupta & Beehr, 1979). Additionally, job satisfaction and organizational commitment have been found to be important attitudinal factors related to voluntary job termination (Porter, Steers, Mowday, &

Boulian, 1974; Steers, 1977). Performance and turnover were thus investigated as salient behavioral outcomes of various organizational properties and individuals' affective reactions to them.

The pattern of relationships among the different sets of variables in the system is specified in the model presented in Figure 1. It should be noted that the model is recursive; that is to say, the causal flow in the system is assumed to be unidirectional with no reciprocal causations or feedback loops. In terms of the model, contextual, role-related, and personal variables represent the exogenous variables in the system and are assumed to be pre-determined. The remaining variables in the model are endogenous, that is, they are considered to be dependent, and their total variation is assumed to be determined by some linear combination of the variables in the system. Job stressors constitute the first level endogenous variables, which are posited to be influenced by antecedent contextual and role-related variables and by personal attributes. Consistent with McGrath's (1976) conceptualization of stress as a response state of arousal, felt stress was treated as a primary psychological outcome directly related to stressor conditions, and both directly and indirectly influenced by the set of exogenous variables. Felt stress, in turn, was posited to be an intervening variable influencing the attitudinal outcomes of job satisfaction and organizational commitment (Bedeian & Armenakis, 1981; Hrebiniak, & Alutto, 1972; Kahn et al., 1964) and, eventually, turnover. Of the two behavioral outcomes examined in relation to individuals' organizational experiences, performance was posited to be influenced most immediately by felt stress (Buck, 1972; Sheridan & Vredenburgh, 1979). No direct effects were posited for satisfaction on performance, because of the equivocal results concerning the satisfaction-performance relationship reported in previous research (Schwab

Figure 1
Structural Model of the Causes and Consequences of Stress



& Cummings, 1970) and recent findings that the relationship is reciprocal and mediated by rewards and other factors (Jacobs & Solomon, 1977; Terborg, Richardson, & Pritchard, 1980). The absence of previously demonstrated relationships between commitment and performance (Steers, 1977) provided the rationale for the exclusion of a commitment-performance link. Consistent with recent findings (Hom, Katerberg, & Hulin, 1979; Porter et al., 1974; Steers, 1977), job satisfaction and organizational commitment were treated as proximal determinants of turnover. Both performance and turnover also were assumed to be influenced directly and indirectly by stressors and the exogenous variables.

Method

Data Collection and Sample

The data for this study were gathered from a medium-sized food processing company. Questionnaires were administered at the work site and completed by 217 persons representing 86 percent of all employees. Of the respondents, 38 occupied managerial and supervisory positions; the rest were in clerical and blue-collar production-related jobs. Of the respondents, 67 percent were male and 33 percent female. Managerial and supervisory personnel also completed a short questionnaire concerning their evaluation of the work performance of each of their subordinates. Turnover data and information pertaining to the job title/rank and organizational location of each individual were obtained from organization records.

Measures

Subsystem. Katz and Kahn's (1966) scheme of generic types of subsystems was adapted to operationalize this contextual variable. The researchers and two other judges assigned subjects in the various departmental units within the organization into five subsystems based on their role in the production/distribution cycle and common dimensions in their primary functions: (1) Administrative subsystem included the "management group," members of the personnel department, and general office staff performing managerial and administrative functions ($n = 32$); (2) Production subsystem 1 included employees in production departments engaged in manufacturing a single product, of limited variety ($n = 64$); (3) Production subsystem 2 consisted of individuals in production units processing several products of great variety ($n = 34$); (4) Technical support subsystem included members of departments providing maintenance, quality assurance, and sanitation services ($n = 44$); (5) Boundary subsystem included employees in units engaged in the supply and movement of materials and finished products within and without the organization ($n = 43$). For all units at least three of the four judges placed the subject in the same subsystem category.

Shift. The dimension of work shift included two categories, first and second shift. A third shift, which partially overlapped with the second shift, included only 12 individuals working in the sanitation department. These 12 persons were grouped with the second shift for the purposes of this study.

Job Level. The organization's ratings of the vertical dimensions of jobs, based on responsibility and authority, as well as education and/or training required, were used to assign the subjects into three job level categories: (1) high level (e.g., managers and supervisors) ($n = 38$); (2) medium level (e.g., computer technicians, salesmen, group leaders, machine operators) ($n = 95$); (3) low level (e.g., clerks, utility workers, machine cleaners) ($n = 84$). This classification reflects the organization's assessment of the labor value of different positions and recognized status differentials among job types.

Task Characteristics. The five task characteristics were measured by scales used by Parasuraman and Alutto (1981): (1) Autonomy, reflecting the degree of freedom built into the job, was measured by a 4-item scale; (2) Closeness of supervision was measured by three items indicating the extent of supervisory influence and control on an individual's daily work; (3) Complexity was a 3-item scale reflecting the training and communications requirements of the job and the degree of complexity of the work itself; (4) Interdependence was measured by two items denoting the functional interrelatedness of jobs; (5) Routinization was a 2-item scale reflecting the degree of repetitiveness of tasks and the extent to which they were governed by rules and regulations.

Leadership Attention. Dansereau's (1972) leadership attention scale was used to assess the immediate supervisor's behavior towards a focal role performer.

Locus of Control. A modified version of Rotter's (1966) I-E scale incorporating the items found to be work-related (Valecha, 1972) was used to measure locus of control. The 7-item scale was scored in the direction of increasing external locus of control.

Trait Anxiety. This characteristic was assessed by a modified short form (Bendig, 1956) of the Taylor (1953) manifest anxiety scale.

Job Involvement. This construct was operationalized by a 3-item measure derived from the original Lodahl and Kejner (1965) scale.

Measures of the demographic characteristics of interest were obtained by means of single item questions asking respondents to indicate their sex, age, and level of education attained. Length of tenure in the organization was assessed from self-reports and confirmed from organizational records.

Job Stressors. The seven situational stressors were operationalized by means of the scales developed by Parasuraman and Alutto (1981). Interunit conflict was measured by four items reflecting communication difficulties, poor interdepartmental cooperation, and overlapping responsibilities. Technical problems consisted of three items indicating resource inadequacies such as equipment breakdowns and defective materials and supplies. Efficiency problems were a 2-item scale reflecting difficulties in achieving productivity standards. Role frustration was a 4-item scale denoting work

overload, low status, inadequate supervisory instruction, and favoritism. Staff shortages, short lead times, and the stressor of too many meetings, were assessed by single items, reflecting inadequacy of human resources, rush jobs under tight deadlines, and time pressures, respectively.

Felt Stress. This attitudinal outcome was operationalized by a 9-item scale developed by Parasuraman (1982).

Job Satisfaction. The Job Descriptive Index constructed by Smith, Kendall, and Hulin (1969) was used to measure job satisfaction.

Organizational Commitment. This attitudinal outcome was assessed by the 4-item scale developed by Alutto, Hrebiniak, and Alonso (1973).

Performance. Job performance was measured by a scale based on supervisory ratings of the quantity and quality of work, and overall job performance of each subordinate.

Turnover. Company records indicated that 28 persons or 12.9 percent of the respondents had voluntarily terminated their employment in the organization during the one year period following the survey. Voluntary turnover was measured by a dichotomous variable indicating whether respondents had resigned or remained with the organization at the end of one year after the questionnaire was administered.

The means, standard deviations, and scale reliabilities of the measured variables are reported in Table 1.

Table

Matrix of Pooled Within-Group Correlations of System Variables

Variable	\bar{X}	SD	1	2	3	4	5	6	7	8	9
1. Shift (Dummy: 1 = 1st shift)											
2. Autonomy	12.37	3.81	.11	.76							
3. Closeness of supervision	9.91	2.75	.01	-.08	.71						
4. Complexity	10.18	2.77	.13	.11	.20	.71					
5. Interdependence	7.12	2.19	-.11	.05	.11	.26	.62 ^b				
6. Routinization	7.49	1.77	.06	-.01	.14	.21	.23	.49 ^b			
7. Leadership attention	24.17	7.72	.02	.23	.20	.07	.13	-.06	.88		
8. Anxiety	7.14	1.58	.13	.02	.02	.19	-.05	.07	-.08	.65	
9. Locus of control	2.56	1.82	.06	-.12	.0	.06	-.09	.10	-.20	.17	.64
10. Job involvement	8.04	2.00	.06	.09	.06	.02	.08	-.05	.15	.10	-.17
11. Sex (1 = male; 2 = female)	1.33	.47	-.04	.11	-.14	-.12	-.05	-.11	.03	-.06	.08
12. Age	37.96	12.95	.14	.01	.02	-.09	.06	.01	.03	-.07	-.09
13. Education	3.26	1.66	-.09	-.11	.09	.23	.07	.09	-.07	-.01	-.07
14. Organizational tenure	7.29	6.98	.27	.15	-.02	.03	.12	.13	-.09	.03	-.06
15. Interunit conflict	19.06	5.93	.13	.0	.12	.20	.04	.12	-.15	.25	.27
16. Technical problems	14.87	4.32	-.01	.0	.19	.20	.16	.09	.02	.23	.05
17. Efficiency problems	10.15	3.10	.02	-.19	.13	.21	.20	.13	-.05	.24	.01
18. Role frustration	17.84	6.56	.10	-.01	.12	.19	.04	.16	-.34	.34	.26
19. Staff shortages	5.00	1.88	.04	.05	.08	.11	.02	.13	-.14	.15	.07
20. Short lead times	4.75	1.99	.15	.05	.12	.12	-.01	.06	-.08	.22	.21
21. Too many meetings	3.03	1.43	.15	.01	.09	.07	.04	-.09	.02	.16	.14
22. Felt stress	21.22	8.18	.08	.20	.11	.27	.01	.12	-.13	.46	.24
23. Job satisfaction	125.91	34.65	.04	.29	.08	-.08	.04	-.14	.50	-.28	-.39
24. Organizational commitment	8.67	2.75	.04	.21	-.07	-.06	.06	-.09	.25	-.22	-.20
25. Rated performance	11.59	2.17	.09	-.03	-.08	-.04	.05	.05	.12	-.17	-.02
26. Turnover	.13	.34	.02	-.19	-.09	.10	-.12	.0	-.07	.12	-.05

^aDecimals omitted for variables (correlation of .11 is significant at the .05 level); figures on the diagonal are scale reliabilities (α).

^bItem intercorrelation.

Data Analysis

A two-step analytical sequence, consisting of multivariate analysis of variance (MANOVA) and path analysis using least squares multiple regression, was employed in testing the tenability of the proposed model and assessing the linkages among the system variables. In view of the methodological constraints and problems involved in applying regression and path analysis techniques to multicategory ordinal variables (Heise, 1969; Land, 1969; Lyons, 1971), the effects of the contextual and role-related variables of subsystem and job level on the remaining variables in the system had to be assessed separately. Accordingly, the MANOVA procedure was utilized to determine the effect of subsystem and job level, respectively, on stressors and the various attitudinal and behavioral outcomes. The two variables, subsystem and job level, then were statistically controlled for by computing pooled within group correlations adjusted to separate subgroup means (Finn, 1974). This procedure eliminated the possibility of confounding the results due to systematic variation in the measured variables among different subsystems and job level categories. The pooled within-group correlations (Table 1) were used as data input for the stepwise multiple regression analysis performed to compute the path coefficients for each of the assumed causal links in the system.

1 Adjusted for Subsystem and Job Level^a

10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
.75																
-.15	—															
.43	-.22	—														
-.22	.04	-.27	—													
.18	-.04	.54	-.30	—												
-.14	.04	-.20	.17	-.03	.74											
-.18	.07	-.27	.06	-.16	.43	.68										
-.06	-.04	-.05	.04	.01	.38	.42	.62 ^b									
-.22	-.10	-.14	.03	.01	.60	.41	.42	.76								
-.10	.10	-.17	-.06	.01	.44	.35	.40	.49	—							
-.10	.06	-.12	.05	.01	.58	.32	.29	.53	.43	—						
.01	.17	.0	-.09	.08	.26	.26	.17	.27	.24	.29	—					
-.20	.04	-.22	.15	.02	.27	.27	.24	.24	.28	.42	.18	.93				
.32	-.04	.18	-.21	.12	-.20	-.20	-.17	-.17	-.20	-.25	-.02	-.52	.91			
.22	.06	.22	-.12	.19	-.17	-.17	-.13	-.13	-.21	-.25	.02	-.33	.44	.88		
.13	-.13	.13	-.06	-.01	-.09	-.09	-.07	-.07	-.18	-.20	-.10	-.21	.13	.05	.85	
.01	-.11	-.12	.03	-.07	.02	.02	.10	.10	.11	.10	-.01	.23	-.06	-.23	-.02	—

In applying path analysis procedures, it was recognized that all of the assumptions underlying such analysis (Billings & Wroten, 1978; Heize, 1969; James, 1980) may not be met fully in this study. Although the robustness of the F and t tests used in multiple regression analysis makes them resistant to minor violations of the assumptions (Kerlinger & Pedhazur, 1973), care was taken to minimize relaxations of the assumptions. First, the correlations among the exogenous variables were examined to check for possible multicollinearity (Gordon, 1968). The correlations among the three sets of exogenous variables ranged from 0 to .51; the median intercorrelation was .09. Second, in view of the theoretical proposition of an *inverted U* relationship between experienced stress and level of performance (McGrath, 1970), a scattergram was plotted to test for possible curvilinearity in the relationship between felt stress and rated performance. The results showed a weak negative relationship between felt stress and performance, but no evidence of an inverted U phenomenon.

Results

The results of the MANOVA performed to assess the effects of subsystem and job level on the system variables indicated significant main effects for both subsystem and job level on four of the seven stressors: technical problems, efficiency problems, role frustration, and too many meetings. Additionally, job level had a significant main effect on the stressor of short lead times. With regard to the outcome measures, job satisfaction and organizational commitment shared the main effects of subsystem and job level; subsystem also had a significant main effect on rated performance.

The individual and joint contributions of subsystem and job level to variations in the dependent measures for which significant main effects were found were assessed by means of multiple classification analysis (MCA) (Kim & Kohout, 1975). The results showed that subsystem had a greater impact than did job level on the stressors of technical problems ($\beta = .45$ vs. $\beta = .16$) and efficiency problems ($\beta = .27$ vs. $\beta = .19$), as well as on rated performance ($\beta = .31$ vs. $\beta = .09$). In contrast, job level impacted more strongly on organizational commitment ($\beta = .36$) than did subsystem ($\beta = .22$). The total or joint effects of subsystem and job level ranged from 6 percent to 24 percent. The amount of variance explained was highest with regard to job satisfaction ($R^2 = .24$), followed by organizational commitment ($R^2 = .21$), and the stressor of technical problems ($R^2 = .21$).

Given the observed differences in the dependent measures across subsystems and job levels highlighted by the MANOVA results, pooled within-group correlations controlling for the effects of subsystem and job level were used to perform the multiple regression analysis and determine the path coefficients for the 12 structural equations representing the model. Table 2 presents a summary of the regression results and the path coefficient representing the direct effects of the predictor variables on each of the dependent measures. The data show that the model as a whole (after

controlling for subsystem and job level) explained 21 percent of the variance in voluntary turnover and 18 percent in rated performance. With regard to the intermediate outcomes, the causally prior variables accounted for 49 percent of the variance in felt stress, 60 percent of the variance in job satisfaction, and 29 percent of organizational commitment. The antecedent contextual, personal, and role-related variables accounted for 13 to 36 percent of the variation in job stressors.

In order to trim the model and make it more parsimonious, the nonsignificant path coefficients in Table 2 were set equal to zero, and the reduced structural equations were reanalyzed according to the procedure specified by Heise (1969). Four of the seven stressors had no significant effects on any of the outcome measures, and they were excluded from further analysis. This resulted in a model consisting of 7 structural equations with 30 direct paths. The results of the reanalysis of the reduced model showed that antecedent variables explained 54 percent of the variance in felt stress, 46 percent of job satisfaction, and 15 percent of the variation in commitment (see Table 3). The explained variance for performance and turnover was 8 percent and 17 percent, respectively (see Table 4). The exogenous variables accounted for 31 percent of the variance in role frustration and 12 percent of the variance in short lead times. Sheaf coefficients (Heise, 1972) were computed to assess the combined effect of the statistically significant role-related and personal variables as well as job stressors on felt stress, job satisfaction, organizational commitment, and turnover. The sheaf coefficients for personal and role-related variables on felt stress were .32 and .24, respectively; the joint influence of role frustration and short lead times was .40. The influence of personal variables as a whole on job satisfaction was .25 and on organizational commitment was .30. The role-related variables had a combined effect of .13 on turnover; felt stress and organizational commitment jointly contributed .26 to turnover.

The figures reported in Tables 3 and 4 illustrate the decomposition of the total effects into constituent direct, indirect, and spurious or noncausal effects (Alwin & Hauser, 1975; Ross, 1975). The results indicate that 25 of the 30 direct paths were significant at the .05 level or better. Role frustration and short lead times were the principal stressors, indicating that work overload, low status, and excessive time pressures are key elements contributing to the experience of stress. Trait anxiety ($p = .35$) and closeness of supervision ($p = .19$) made a positive contribution to the perceived prominence of role frustration; on the other hand, job involvement ($p = -.21$) and leadership attention ($p = -.30$) reduced the perceived magnitude of this stressor. The stressor of short lead times was positively influenced by three exogenous factors—closeness of supervision ($p = .14$), anxiety ($p = .19$), and external locus of control ($p = .18$).

A number of exogenous variables impacted directly and indirectly on felt stress. It may be seen that role frustration had a somewhat greater capacity to induce felt stress ($p = .27$) than did short lead times ($p = .19$). The power of trait anxiety to engender feelings of stress and psychological strain

Table

**Summary of Stepwise Multiple Regression Results:
and Attitudinal and**

Variables	Independent Effect of Added Variables						
	Job Stressors						
	Interunit Conflict	Technical Problems	Efficiency Problems	Role Frustration	Staff Shortages	Short Lead Times	Too Many Meetings
Shift (Dummy: 1 = 1st shift)	07	0	0	07	03	11	13
Autonomy	02	-01	0	-13*	-02	08	-04
Closeness of supervision	17*	18**	11	14*	10	15**	12
Complexity	05	08	10	10	07	02	04
Interdependence	09	19**	18**	09	02	02	11
Routinization	-03	0	04	03	10	-02	-15*
Leadership attention	-15*	-03	-07	-28***	-14	-08	01
Sex (Dummy: 1 = male)	0	06	01	-07	11	04	19*
Age	-16*	-15	01	-08	-19*	-08	-01
Education	15*	-04	-02	-06	-13	03	-07
Organizational tenure	-02	-13	-02	02	06	01	04
Anxiety	21**	25***	24***	28***	10	19**	14
Locus of control	17*	-04	-05	12	-01	14*	12
Job involvement	-08	-16*	-10	-20**	-04	-08	-01
Interunit conflict							
Technical problems							
Efficiency problems							
Role frustration							
Staff shortages							
Short lead time							
Too many meetings							
Felt stress							
Job satisfaction							
Organizational commitment							
R ²	26***	22***	14*	36***	13*	15**	13*

*Decimals omitted.

* $p \leq .05$

** $p \leq .01$

*** $p \leq .001$

was reflected in its direct effect on felt stress ($p = .31$) as well as in its indirect influence through role frustration and short lead times. The task characteristic of complexity tended to heighten the experience of stress ($p = .14$) slightly. On the other hand, increased job autonomy ($p = -.19$) and age ($p = -.13$) tended to reduce the severity of felt stress. Leadership attention, job involvement, locus of control, and closeness of supervision had indirect effects on felt stress through their influence on role frustration and short lead times.

As posited by the model, felt stress directly influenced individuals' affective reactions toward their jobs and decreased job satisfaction ($p = -.32$), as was the case with the stressor of role frustration ($p = -.15$). Leadership attention had a direct and positive effect ($p = .37$) on job satisfaction.

2

Direct Effect of Antecedent Variables on Job Stressors, Behavioral Outcomes^a*(Standardized Net Regression Weights)*

<i>Attitudinal and Behavioral Outcomes</i>					<i>Variables</i>
<i>Felt Stress</i>	<i>Job Satisfaction</i>	<i>Organizational Commitment</i>	<i>Rated Performance</i>	<i>Turnover</i>	
-.04	.02	.04	-.07	0	Shift (Dummy: 1 = 1st shift)
-.19***	.05	.09	-.08	-.19*	Autonomy
.04	-.07	-.06	-.16*	-.18*	Closeness of supervision
.12*	.04	.02	.04	.12	Complexity
0	-.02	-.01	-.01	-.13	Interdependence
-.02	-.04	0	.11	.01	Routinization
.07	.35***	.17*	.16*	0	Leadership attention
-.02	-.11	.08	-.09	-.07	Sex (Dummy: 1 = male)
-.15*	-.11	.03	.06	-.11	Age
.08	.05	0	-.10	.06	Education
.11	.09	.20*	-.04	.03	Organizational tenure
.32***	-.08	-.16*	-.16	-.03	Anxiety
.04	-.16**	.06	.06	-.13	Locus of control
.12	.13*	.11	.11	.10	Job involvement
0	-.12	-.04	-.22*	.11	Interunit conflict
-.04	-.01	.02	.02	-.08	Technical problems
-.03	.02	.02	0	.07	Efficiency problems
.27**	-.15*	-.05	.03	.03	Role frustration
0	.03	-.09	-.15	-.01	Staff shortages
.18***	.06	-.07	-.14	-.01	Short lead time
.01	.10	.11	-.02	-.02	Too many meetings
	-.30***	-.09	-.13	.20*	Felt stress
				.16	Job satisfaction
				-.18*	Organizational commitment
.49***	.60***	.29***	.18*	.21*	R ²

Of the personal characteristics, job involvement ($p = .15$) and organizational tenure ($p = .12$) tended to enhance job satisfaction, and external locus of control diminished it ($p = -.17$). The remaining exogenous variables affected job satisfaction largely indirectly through role frustration, short lead times, and felt stress. Organizational tenure ($p = .22$) and leadership attention ($p = .26$) were the primary factors contributing to increased commitment to the organization, whereas anxiety tended to reduce ($p = -.22$) organizational commitment. Contrary to expectations, felt stress was causally unrelated to organizational commitment.

With regard to the behavioral outcomes, none of the antecedent variables had a significant direct effect on performance. Felt stress and organizational commitment were the two most immediate predictors of turnover;

felt stress contributed directly ($p = .20$) to increased turnover, and organizational tenure ($p = -.20$) diminished it. The decision to terminate also was

Table 3
Direct, Indirect, and Total Effects of Antecedent Variables
on Job Stressors and Attitudinal Outcomes^a

Antecedent Variables	Job Stressors				
	Role Frustration		Short Lead Times		
	Direct Effect	<i>r</i>	Direct Effect	<i>r</i>	
Autonomy	-11	-19			
Closeness of supervision	19**	12	14**	12	
Leadership attention	-30***	-34			
Anxiety	35***	34	19**	22	
Locus of control			18**	21	
Job involvement	-21***	-22			
<i>R</i> ²	31***		12*		
Ratio of correlations duplicated within $\pm .10$	5/5		3/3		

Antecedent Variables	Felt Stress				
	Effect				
	Direct	Indirect	Total	Spurious	<i>r</i>
Autonomy	-19**	-01	-20	0	-20
Closeness of supervision		07	07	04	11
Complexity	14**	04	18	09	27
Leadership attention		-09	-09	-04	-13
Anxiety	31***	11	42	04	46
Locus of control		06	06	18	24
Job involvement	-12*	-06	-18	-02	-20
Age	-13*				
Organizational tenure		-03	-03	01	-02
Role frustration	27***		27	28	55
Short lead times	19**		19	23	42
<i>R</i> ²	46***				
Ratio of correlations duplicated within $\pm .10$	8/11				

Antecedent Variables	Job Satisfaction				
	Effect				
	Direct	Indirect	Total	Spurious	<i>r</i>
Autonomy		08	08	21	29
Closeness of supervision		-06	-06	03	-03
Complexity		-07	-07	-01	-08
Leadership attention	37***	04	41	09	50
Anxiety		-21	-21	07	-28
Locus of control	-17**	-04	-21	18	-39
Job involvement	15**	08	23	09	32
Age		05	05	13	18
Organizational tenure		13	13	-01	12
Role frustration	-15*	-07	-22	-30	-52
Short lead times		-05	-05	20	-25
Interunit conflict		-10	-10	-02	-12
Felt stress	-32***		-32	20	-52
<i>R</i> ²	54***				
Ratio of correlations duplicated within $\pm .10$	7/13				

^aDecimals omitted.

* $p < .05$

** $p < .01$

*** $p < .001$

Table 3 (continued)

Antecedent Variables	Organizational Commitment				r
	Effect				
	Direct	Indirect	Total	Spurious	
Autonomy		2	12	09	21
Closeness of supervision		-11	-11	03	-08
Complexity		-03	-03	02	05
Leadership attention	26***	02	28	-03	25
Anxiety	-20**	-03	-23	01	-22
Locus of control		-07	-07	-13	-20
Job involvement		13	13	09	22
Age		07	07	15	22
Organizational tenure	22**	-03	19	0	19
Role frustration		-10	-10	-25	-35
Short lead times		-12	-12	-13	-25
Interunit conflict		-03	-03	-14	-17
Felt stress		-10	-10	-23	-33
R ²	15*				
Ratio of correlations duplicated within $\pm .10$	7/13				

*Decimals omitted.

* $p < .05$

** $p < .01$

*** $p < .001$

directly influenced by autonomy ($p = -.13$). Contrary to expectations, job satisfaction had no effect on voluntary job termination by the focal role performer.

The large sample chi square test (Joreskog & Sorbom, 1978; Kim & Kohout, 1975) was performed to determine the adequacy of the restricted model. The results showed that the full and reduced models did not differ significantly in their ability to explain variance in the outcome measures. As a further measure of the "goodness of fit" of the reduced model, the estimated correlations as represented by the sum of the direct and indirect effects were examined to assess the extent to which they were consistent with the original correlations between the predictor variables and the dependent measures (Billings & Wroten, 1978; Kerlinger & Pedhazur, 1973). Applying the criterion that the absolute difference between the reproduced and original correlation does not exceed .10 (Martin, 1981; Namboodiri, Carter, & Blalock, 1975), the data showed that the reduced model duplicated all five correlations for role frustration and all of the correlations for short lead times. A smaller proportion of correlations was reproduced for felt stress (7 out of 11). For job satisfaction and organization commitment respectively, 7 of 13 of the reconstructed correlations were consistent with the original coefficients. For performance, 11 of 13 correlations were duplicated; for turnover 13 of 14 reconstructed correlations fell within the limits specified.

Discussion

Overall, the results of this study provided moderate support for a multi-dimensional model of stress and yielded valuable insights into the etiology

of work-related stress and its consequences for the individual and the organization. The data revealed that both contextual and role-related variables, as represented by subsystem and job level, respectively, independently contributed to variation in job attitudes and behavior, as well as the reported magnitude of job stressors. It appears, therefore, that individuals' perceptions of work-generated stressors and their eventual reactions to these organizational realities are importantly influenced by their location within a particular organizational space. These findings tend to confirm theoretical propositions (Katz & Kahn, 1966; McGrath, 1976) concerning the importance of contextual and role-related referents in indexing members' work experiences and are consonant with previously reported results (Adams et al., 1977; Parasuraman & Alutto, 1981).

The path analysis results provided tentative evidence concerning the logical consistency of the posited structural model and, in general, indicated qualified support for the assumed causal pattern of relationships among the system variables. Personal variables were found to influence stressors directly and somewhat more strongly than role-related variables. The role of trait anxiety in enhancing the perceived magnitude of stressors was demonstrated by its positive effect on both role frustration and short lead times. The finding that external locus of control increased the perceived prominence of short lead times demonstrates the role of employees' attributions of responsibility on perceptions of environmental stressors (Beehr & Newman, 1978). In contrast, job involvement tended to diminish role frustration, suggesting that ego involvement with work serves to temper the adverse perceptions of work overload and low status. The negative effect of leadership attention on role frustration indicated the buffering impact of supportive supervisory behavior on the perceived prominence of stressors. Closeness of supervision, which may tend to limit individuals' behavioral options, served to increase role frustration. Thus, as suggested by Buck (1972) and McLean (1979), it appears that it is the perceived lack of individual control that renders particular situations stressful.

As predicted, both role frustration and short lead times directly contributed to the experience of stress as demonstrated by their positive effects on felt stress. Among exogenous variables, the greater sensitivity of anxious individuals to environmental stressors was manifested in the strong contribution of trait anxiety to felt stress. This finding is similar to the results reported by Kahn and his associates (1964) concerning the role of neurotic anxiety in modifying reactions to role conflict and role ambiguity. The negative effect of age on felt stress indicates that increased maturity generally associated with age tends to enhance the stress-tolerance ability of individuals. It appears that older individuals may have developed coping mechanisms for dealing with stressors, whereas younger persons may be less skilled in coping due to their shorter period of work experience. It also is possible that age has a leveling effect in that it results in a downward adjustment of expectations concerning job conditions, or that older persons just accept stressful conditions as a fact of organizational life. The finding that

autonomy decreased felt stress indicates that increased role latitude may enable individuals to deal more effectively with stressful work experiences. On the other hand, the direct effect of complexity on felt stress observed in this study suggests that this task characteristic may itself be a stressor (Caplan et al., 1975).

A major finding of this study was that felt stress and low organizational commitment directly contributed to voluntary termination of employment. This finding partially confirms previously reported studies suggesting that commitment may prove to be a better predictor of turnover than job satisfaction (Hom et al., 1979; Porter et al., 1974). The results would seem to support Porter et al.'s (1974) contention that organizational commitment is a more global and enduring evaluative response to the organization as a whole than job satisfaction, which may be a more transitory affective reaction to a particular job. Thus job dissatisfaction may reflect a rejection of the job, but not necessarily of the organization. As a result, low commitment to the organization is likely to be a more potent contributor to the decision to terminate than job dissatisfaction.

Felt stress was not found to be causally linked to commitment as was expected from previous findings (Bedeian & Armenakis, 1981; Hrebiniak & Alutto, 1972). Yet both stress and commitment independently contributed to voluntary severance of the employment relationship. This suggests that withdrawal from the organization is an impulsive and emotionally generated behavioral response to high experienced stress or psychological strain. On the other hand, voluntary termination also is a considered behavioral response based on low stakes in the organization (Hrebiniak & Alutto, 1972).

The results of this study demonstrate the utility of investigating both macro and micro aspects of the organization in gaining a more comprehensive understanding of the precursors and consequences of work-related stress. The results must be interpreted cautiously, however. Given the use of self-reports to measure many of the variables employed in this study, it is acknowledged that common method variance may have accounted for some of the observed relationships among the system variables. Although the formal test of significance revealed no difference between the full and reduced models in their ability to explain variance in the dependent measures, the marked decline in the percentage of variance explained in organizational commitment (29 to 15) and performance (18 to 8) in the restricted model suggests that possibly some paths that should have been retained were deleted (Billings & Wroten, 1978). Thus, in theory trimming it may be useful to combine the criterion of statistical significance with that of meaningfulness for selecting paths to be retained (Kerlinger & Pedhazur, 1973; Land, 1969). Furthermore, the decomposition of the path coefficients into constituent direct and indirect effects indicated a somewhat low level of correspondence between some of the reconstructed and original correlations (for example, role frustration with felt stress, job satisfaction, and commitment). This suggests that part of the original relationship was spurious; that is to say, part of the original zero-order correlation was the result of the joint

effect of causally prior variables (Ross, 1975). Other explanations include the possibility of correlated residuals, incorrect ordering of the variables, and unmeasured variables (Billings & Wroten, 1978; James, 1980; Kerlinger & Pedhazur, 1973). Multicollinearity among some of the variables (e.g., stressors) and the modest reliability of some measures may be additional limitations. Nevertheless, the path analysis of the structural model provides important insights into the internal dynamics of the system and represents a starting point for additional research using multivariate causal models. Based on the findings of this study, however, some modifications to the model appear indicated in order to enhance its explanatory power with regard to the phenomena of interest. The key changes suggested pertain to the role of the first and second level outcomes in relation to voluntary turnover. Thus it is proposed that felt stress and organizational commitment be regarded as critical personal outcomes that directly and independently contribute to the decision to terminate employment. In contrast, job satisfaction might be viewed as an alternative second level outcome, unrelated to turnover. This reordering acknowledges the importance of job satisfaction as a personal outcome but recognizes that, as a short term and potentially changeable attitude, it may not be sufficient to induce voluntary separation.

Given that the stress-performance relationship, though nonsignificant, was in the expected direction, it is suggested that performance be retained as a salient organizational outcome. The weak relationship between felt stress and performance found in this study was due possibly to the assembly line operations in which a large proportion of the subjects were working, and the consequent low variation in individual performance. Another possible explanation is that for individuals who had developed adaptive coping mechanisms, the experience of stress had little effect on performance. This suggests that the stress-performance relationship may be mediated by the effectiveness of the coping mechanisms evoked. Thus it is possible that under certain circumstances, felt stress may be accompanied by high performance.

The present study provides a useful starting point toward the development of tenable multivariate causal models of stress, its antecedents and outcomes in organizations. It also demonstrates the value of objective measures of behavior—in this case, turnover—in assessing the predictive utility of perceptually based measures. The results serve also to underscore the need for developing appropriate research designs for longitudinal research in order to capture more effectively the dynamic processes involved in the generation of stressors at work and employees' reactions to them.

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Environmental Boundary Spanning and Information Processing Effects on Organizational Performance¹

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The boundary spanning activity of the entrepreneur is used to examine the strategic management process in small business. In a sample of 82 owner/operators, intensive boundary spanning activity was strongly related to organizational performance, and information processing capability significantly affected the performance-boundary spanning relationship.

The strategic management of small business organizations has been a generally neglected area of research. This is the case in spite of the numerous calls for investigations into the strategic management process and suggestions concerning how these investigations might be executed (Cooper, 1978; Dandridge, 1979; DeCarlo & Lyons, 1980; Schendel & Hofer, 1978; Sexton, 1982; Susbauer, 1978; Vesper, 1978). This is especially true for the very small business, termed by Brockhaus (1982) "microbusiness." Yet the microbusiness provides almost laboratory conditions (relative to large complex organizations) for the study of strategic management. The small business organization has been theorized to have a simple goal structure (Schendel & Hofer, 1978), a clean proximate environment (Schendel & Hofer, 1978), a direct chain of command between goal formulation and implementation (Mintzberg, 1978), and it is the basic and most populous form of business organization in this society.

This research concerns strategic management in the very small firm. The focus of this study is on the strategic behavior of the owner/operator of the small business organization, the entrepreneur.

Brockhaus (1982) notes that most investigators and writers in the field would consider the owner/operator of a small business to be an entrepreneur. The owner/operator is personally at risk but, unlike a simple

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investor, undertakes to conduct the business on a day-to-day basis. The entrepreneur is Mintzberg's "commander" form of peak coordinator, performing the strategic management tasks of balancing the interests of the environment and the firm in which he is dominant (Mintzberg, 1978). Strategic management is an entrepreneurial task (Learned, Christensen, Andrews, & Guth, 1965), and the owner/operator of the small business firm therefore is the master strategist for the organization (Mintzberg & Waters, 1982).

The problem of studying the owner/operator as strategist is that strategy making and implementation may be informal, implicit, or inarticulated. If strategy is defined as "the pattern of decisions . . . that determines and reveals [the firm's] objectives, purposes or goals, [and] produces the principal policies and plans for achieving those goals . . ." (Andrews, 1980, p. 18), then perhaps by observing the pattern of the owner/operator's behavior, the firm's strategy may be revealed. However, it is conceivable that the pattern observed appears to hold little relevance for the firm or that no pattern emerges at all. In the first instance, if the pattern of the owner/operator's decisions does not seem to be relevant to the firm, then "business" strategy is not being observed. This behavior is not related to the role of owner/operator and entrepreneur. Either someone else is fulfilling the role or the firm's executive functions have been neglected. The owner/operator's behavior is not purposeless; however, the firm cannot be considered the focal point of that behavior. In the second case, if no pattern emerges, then the strategy being observed probably is ineffective because strategy is seen as the major source of cohesiveness in the firm (Vancil, 1976). However, before the attribution of ineffective strategy is made, the criteria for performance need to be explicit. Performance criteria typically are ill-defined in entrepreneurial situations once survival is not an issue. Thus the problem for the researcher in trying to relate a pattern of decisions, or activities, (strategy) to performance is imposing.

However, Mintzberg's analysis of the peak coordinator as coalition manager provides an insight as to how to operationalize strategic activities for the small business owner/operator. Mintzberg viewed the owner/operator as the mediator between the internal and external forces. This is conceptually equivalent to viewing the entrepreneur in his boundary spanning role. Boulton, Lindsay, Franklin, and Rue described the strategic planner as a boundary spanning individual. They recognized that in the course of boundary spanning activity, information is collected which has "strategic value, [and is] relevant to short term tactical managerial decisions, or [may] concern technical developments that . . . affect an organization's technical core" (1982, p. 501). In the microbusiness, the entrepreneur occupies the boundary spanning role. Therefore the strategic activities in which the owner/operators engage manifest themselves as boundary spanning activities.

The boundary spanning model and boundary spanning activity are relatively familiar. Adams (1976) listed five types of boundary spanning activity as: filtering, transacting, buffering, representing, and protecting.

Evan (1966) believed that by studying the boundary spanning activity of an organization, one could deduce its goal structure, strategy, and implementation plan. Organ (1971) viewed the boundary spanner as the "linking pin" between the organization and its environment. Wilensky (1967) called the boundary spanner the "contact man" who mediates the paradox caused by external forces demanding flexibility and internal ones requiring orderliness and efficiency. Aldrich and Herker hypothesized that "the organization's ability to cope with environmental constraints depends in part on the ability of the boundary spanning individual to achieve a compromise between organizational policy and environmental constraints. . . ." (1977, p. 221). Therefore, it may be reasonable to view the entrepreneur's boundary spanning activity as an important aspect of the implicit strategy formulation and implementation process that must exist in the small business organization. The entrepreneur's boundary spanning activity represents both the perception of the aspects of the environment for which action is necessary and the commitment of organizational resources (the owner's time and expertise).

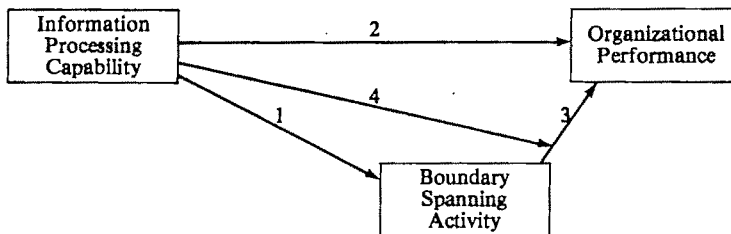
Because of the owner/operator's tremendous influence on his organization's activities, the personal characteristics of this individual are important to organizational performance. Two streams of research converge on this matter. The relationship between personal characteristics and boundary spanning has been summarized by Miles (1980). Among the correlates mentioned are flexibility, extroversion, tolerance of ambiguity, self-assurance, need for visibility, and *savoir faire*. The relationship between personal characteristics and entrepreneurship has focused on the tendency to become an owner/operator of a small business. Among the possible correlates are: need for achievement (McClelland, 1971), locus of control (Borland, 1975; Shapero, 1980), leadership and independence (Hornaday & Aboud, 1975), risk-taking (Bröckhaus, 1980; Shapero, 1980), and integrative complexity (McGaffey & Christy, 1975).

Because this study examines the boundary spanning activity of the owner/operator, it would seem appropriate to concentrate on the personal characteristics of entrepreneurs who interact with the environment. The environment has been characterized in terms of complexity, change, heterogeneity, and uncertainty (Conrath, 1967; Drucker, 1980; Lawrence & Lorsch, 1967; Terreberry, 1968; Thompson, 1967). Weick (1969) advocates that the salient features of the environment are only those that are "enacted" by the individual's perception. It appears that the manner in which the individual processes information and the choice of which information to process are the important personal characteristics for the small business owner/operator in the boundary spanning role.

Figure 1 represents the general model for this research.

Arrow 1 indicates the relationship between information processing capability and boundary spanning activity. The more sensitive the individual is to salient information in the environment, the more boundary spanning activity will be performed (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964;

Figure 1
General Model of the Interaction of Boundary Spanning Activity, Organizational Performance, and Information Processing Capability



Leifer & Delbecq, 1978). Also, if the boundary spanning of the owner/operator is considered as a surrogate for structure (Evan, 1966), then the more complex information capabilities will require more boundary spanning. Individuals who can discriminate among a wide variety of stimuli possess a larger potential for information processing (Schroder, Driver, & Streufert, 1967). This increases their capacity for boundary spanning activity. Individuals who cannot deal with a wide variety of stimuli focus on only the least ambiguous information and have a decreased capacity for boundary spanning. By this reasoning, the entrepreneur who attends to only unambiguous events has no need for boundary spanning and strategic planning.

H1: There is a positive relationship between integrative complexity and boundary spanning activity.

H2: There is a negative relationship between intolerance of ambiguity and boundary spanning activity.

Arrow 2 indicates the relationship between information processing capability and organizational performance. Because boundary spanning is not the only managerial and entrepreneurial activity of the owner/operator, higher levels of information capacity contribute to performance—for example, through the design of more efficient production methods or control systems. In addition, the increased information processing capability results in more finely tuned strategic plans. The organization's financial performance will be better as a result.

H3: There is a positive relationship between integrative complexity and financial performance.

H4: There is a negative relationship between intolerance of ambiguity and financial performance.

Arrow 3 shows the relationship between boundary spanning and performance. Higher levels of boundary spanning are associated with higher levels of financial performance. The small business faces a turbulent environment (Child, 1972; Drucker, 1980) and requires boundary spanning activity to maintain its position and equilibrium (Benson, 1975). Entrepreneurial boundary spanning activity provides the owner/operator with the information necessary for strategy formulation. Simultaneously, the transactions between the entrepreneur and the environment implement the strategy.

The hypothesis below posits the direct link between strategy and performance.

H5: There is a positive relationship between boundary spanning activity and financial performance.

Arrow 4 indicates that the information processing capability of the owner/operator may affect the boundary spanning-performance relationship. To wit, if the capability to interpret and recode information from the environment is lacking (low capability), the boundary spanning performed would be ineffective and not contribute to the firm's financial performance. The implication is that only "good" strategy is effective. The strongest boundary spanning-performance relationships would be found in individuals with high information processing capability.

H6: When the owner possesses high integrative complexity, the boundary spanning-financial performance relationship will be stronger than that found in the low integrative complexity owner.

H7: When the owner possesses low intolerance of ambiguity, the boundary spanning-financial performance relationship will be stronger than that found in the high intolerance of ambiguity owner.

Two assumptions concerning the operationalization of the model should be made explicit. The first is that the owner/operator is the dominant boundary spanner in his organization. If boundary spanning is delegated to a considerable extent, tests of the model will be inconclusive because the wrong subject is involved. The second assumption is that the owner/operator's boundary spanning is nontrivial. That is, the behavior under examination occurs often, and it represents a major activity for the subject. These two assumptions are subject to a validity check: Is the percentage of time spent in boundary spanning relatively large in proportion to other owner/operator activities? What percentage of the organization's total boundary spanning is performed by the owner/operators? Answers to these two questions are provided in the results section.

Method

Sample

Data were collected by survey instrument from the owner/operators of four different types of small business organizations. There were 38 retail firms (food and apparel) and 44 manufacturing firms (food and apparel). Subjects were selected at random from phone directories in the Allentown-Bethlehem-Easton Pennsylvania SMSA. Of the owner/operators contacted by phone prior to mailing the survey, 180 met the inclusion criteria. The criteria were:

- firm be owner operated (≥ 51 percent ownership)
- firm have between 2 and 100 employees
- firm be in operation one year or longer

The total number of usable responses was 82 (45.5 percent). Among the demographic characteristics of the informants sampled were: median age of the owner/operator, 45 years; educational level, mode=some college; there were 66 males and 12 females (4 missing data). The average age of the firms was 29.46 years, and the average number of employees was 46.35 (mean).

A potential problem exists in the use of informants in organization research. Seidler (1974) reports that informants, people who give descriptions of relationships and patterns of behavior, may be biased. The bias increases the more vague and controversial the information and the larger the unit size being observed. Researchers sensitive to these issues—for example, Dewar and Werbel (1979)—have used multiple informants in each unit.

In this study, only the owner/operator was surveyed in each firm. However, the nature of the information—that is, to report the number of hours and contacts with people outside the organization—appears neither vague nor controversial. Seidler's (1974) work was in the context of leadership, conflict, and satisfaction in Roman Catholic dioceses and included measures of leadership style, ideological polarization, satisfaction, and conflict between bishops and clergy. These clearly are controversial issues, and biases were observed in the informants. No such biases are expected in this study.

The size of the unit within which the informant is reporting presents a different problem. Seidler's dioceses ranged from 1,400 members for large cities to 20 members for the smallest unit. His results indicate that bias (low interrater reliability) increases the larger the unit size. Even though the firms under investigation in this study are small businesses, it may be that the owner/operator is unaware of the amount of additional boundary spanning activity taking place in his organization. This poses two problems: (1) the amount of others' boundary spanning activity reported may be biased (direction unknown) and (2) the effect of the boundary spanning on performance is unmeasured.

However, these problems are not insurmountable. Seidler suggests guidelines to counteract bias when selecting informants. Among these are: (a) select a balanced set of informants (expecting bias in both directions); (b) standardize the informants by selecting occupants of the same positions; and (c) select informants who have access to the information needed. These three criteria to minimize bias are met by the subjects in this study. Owner/operators of all sizes of small firms (range 2 to 100; average number of employees 46) are included. All subjects hold the same organizational position, and all subjects have direct access to the information requested.

The second problem, measuring the effects of this additional boundary spanning activity, is dealt with in the procedures section.

Measures

The data reported here are part of a larger study, and only the relevant portions are included. Boundary spanning was measured in two ways.

Subjects were asked to record the number of hours and the number of contacts they had in an average week with each of nine categories of environmental constituencies. The categories were: (1) customers/clients; (2) suppliers/vendors; (3) interviewing new employees; (4) bankers, lawyers, accountants; (5) business, professional, and trade associations; (6) regulators, government, and union officials; (7) outside stockholders or creditors; (8) competitors; and (9) other business related activity. The sum of the hours spent in these activities divided by the number of hours worked per week is a measure of how intensive the owner/operator's boundary spanning activity is: the percentage of work time spent in boundary spanning activity. The sum of the number of contacts is an extensive measure. (The calculation of the variables used in the statistical tests reported below did not include customer/client figures because many subjects reported very large customer/client counts, indicating a cashier's role and not actually boundary spanning.)

Two measures of information processing capability were used. The first was intolerance of ambiguity (Budner, 1962). This is a 16-item questionnaire. Budner defined intolerance of ambiguity as the tendency to perceive ambiguous situations as sources of threat. The situations may be new, complex, or insoluble. As such, this definition represents the "content" dimension of information capability. Budner reported a series of reliabilities (Cronbach's alpha) ranging from .39 to .62 for the scale and admitted that the low reliability was because of the multidimensionality of the variable. The reliability for the subjects in this study was $\alpha = .56$.

The second measure used was integrative complexity, which was operationalized by the Schroder sentence completion test (Schroder et al., 1967). The three sentence items to which the subjects responded were:

"When I am in doubt...."

"Rules...."

"When I am criticized...."

Schroder et al. (1967) provide a scoring manual, and responses are scored along a 7-point Likert scale. The criterion for scoring is the complexity with which the answers are structured. The two highest scores are averaged for the final score. This method produces the same internal reliability as the correlation between total score and each item of a 6-item measure (Schroder et al., 1967). Cronbach's alpha for the two items in this study was .87.

Performance was measured by net addition to retained earnings, current sales, and the gross economic benefits accruing to ownership for 1981. This last measure was constructed by prorating by percentage of ownership the owner's draw, fringe benefits, cash dividends, and net additions to retained earnings. It represents the total economic benefits available to ownership (adjusted for more than one equity position). This measure was suggested by Webster (1977) and Susbauer (1978).

Testing the Hypotheses

Hypotheses 1 and 2 were tested using simple correlation coefficients. However, in Hypotheses 3 through 7, financial performance is the dependent

variable, and a number of influences on a firm's performance, other than the owner's boundary spanning and information capability, need to be considered. Data were collected on four of these possible influences: the type of business (a nominal variable), the age of the firm, the number of employees (size), and the total number of hours that all organizational members engaged in boundary spanning (as reported by the owner).

The variation in performance attributable to these four contextual influences was controlled for by entering these variables into the regressions on financial performance first, and then entering the independent variable of interest. The test used was the significance of the F -ratio due to the change in the R^2 for the regression (Kerlinger & Pedhazur, 1973).

Results

Evidence of Validity

An examination of Table 1 shows that there is evidence of construct validity for the general model of Figure 1. The correlations among the variables representing the three constructs—information processing capability, boundary spanning activity, and financial performance—all (with one exception) possess the correct sign and are statistically significant. The exception is the correlation between net additions to retained earnings and gross economic benefits. The near-zero correlation may indicate that in the short run, on an annual basis, the level of earnings attained does not affect executive compensation. Further evidence for this is found in the positive correlation between gross economic benefits and a 3-year average of earnings ($r = .35, p < .05$). This indicates that over a longer period executives' compensation is related to the level of earnings.

Another validity check concerns the assumption that the owner/operator is the key boundary spanner in the organization. This also is borne out, by both qualitative and quantitative data. The results show that for all boundary spanning activity (including customers), the owner/operator spends 33 working hours (59 percent of work time) and has 137 boundary spanning contacts per week. Even excluding customers, the owner spends over a quarter of his time (27 percent) engaged in boundary spanning.

Compare these figures to the amount of total organizational boundary spanning reported by the owner (in Table 1). Given that the owner's estimate is biased but that the bias is standardized, the owners report an average of 78 hours of boundary spanning for the entire firm. Thus, the owner's proportion of all the firm's boundary spanning is $(33/33 + 78)$ 29.7 percent. Further, if the bias is not standardized across firms, it most likely is represented in customer-related boundary spanning because this is the largest single category of boundary spanning reported. When customer-related boundary spanning is removed from the totals, the owners report an average of 15 hours of boundary spanning versus 12 hours for all other

Table 1
Means, Standard Deviations and Zero-Order Correlations
(Number of Cases in Upper Triangle)

	Mean	S.D.	1	2	3	4	5	6	7
1. Boundary spanning (pct. time)	26.8	22.6	—	68	74	66	59	54	52
2. Boundary spanning contacts	24.3	23.2	.38***	—	70	60	55	50	65
3. Intolerance of ambiguity	60.0	10.5	-.10	-.11	—	67	61	56	54
4. Integrative complexity	5.7	1.9	.21*	.02	.31**	—	55	51	49
5. Sales (\$)	1,795,525.	2,690,688.	.43***	.27*	-.29*	.06	—	55	53
6. Retained earnings (\$)	22,427.	37,069.	.12	.29*	.12	.01	.44***	—	55
7. Gross economic benefits (\$)	168,445.	430,797.	.61***	.06	-.16	-.04	.40***	.01	—
Contextual variables									
Total organization BSA (hours)	78.2	105.1	.09	.06	-.18	.20	.33**	.06	.24*
Number of employees	46.3	74.3	.08	.09	-.02	.19	.39**	.48***	.07
Age of firm (years)	29.5	22.0	.01	-.05	-.03	.12	-.04	-.03	.02
Type of business (nominal variable)*			.04	.16	.01	.04	.09	.04	.07

*Correlation reported is η^2 (proportion of variance explained).

* $p < .05$

** $p < .01$

*** $p < .001$

organizational participants. Thus, the owners report that they perform (15/12 + 15) 55.5 percent of all noncustomer boundary spanning themselves.

This information seems plausible when compared with qualitative information obtained from the informants. The owners were asked to list the job titles of employees who also engaged in boundary spanning activity. Of the 82 subjects, 29 reported no other boundary spanners. Only 18 reported purchasing agents or buyers. In fact, only six firms reported job titles that suggested boundary spanning of a strategic nature (three vice-presidents, two engineers, and one consultant). Taken together, the data strongly suggest that the owner/operator clearly is the dominant boundary spanner in the organization and that boundary spanning activity comprises a major entrepreneurial role.

Results of Hypothesis Tests

Table 1 shows the intercorrelations among the variables. The relationship between integrative complexity and boundary spanning as a percentage of time is positive and significant ($p < .05$). The relationship between intolerance of ambiguity and both measures of boundary spanning, though not statistically significant, is negative, and this is the expected sign. Therefore, Hypothesis 1 is accepted, and there is evidence in support of Hypothesis 2.

Hypotheses 3, 4, and 5, describe the effect of integrative complexity, intolerance of ambiguity, and boundary spanning activity on the financial performance of the firm. These hypotheses were tested by examining the incremental variance explained by the independent variable after the effects of the contextual variables were removed. Table 2 shows the results of the regressions of the contextual variables on financial performance.

Table 2
Results of Regression of the Contextual
Variables on Financial Performance

<i>Financial Performance</i>	<i>Variable</i>	<i>B</i>	<i>S.E. B</i>	<i>F</i>
Sales	Total organization BSA	12,029.	2,964.	16.5
	Age of firm	-241,250.	238,820.	1.0
	Type of business	-721,030.	385,888.	3.5
	Number of employees	20,240.	4,215.	23.0
	Constant	555,248.		
$R^2 = .41$ $S.E. = 2,155,098$	$F_{4,50} = 8.54$ ($p < .001$)			
Retained earnings	Total organization BSA	67.	45.	2.2
	Age of firm	-2,773.	3,698.	.6
	Type of business	-9,633.	5,976.	2.6
	Number of employees	285.	65.	19.1
	Constant	11,191.		
$R^2 = .31$ $S.E. = 32,115$	$F_{4,46} = 5.5$ ($p < .001$)			
Gross economic benefits	Total organization BSA	1,137.	630.	3.2
	Age of firm	3,596.	50,745.	.0
	Type of business	-8,408.	81,995.	.1
	Number of employees	846.	895.	.9
	Constant	30,313.		
$R^2 = .08$ $S.E. = 431,736$	$F_{4,44} = .09$			

Table 2 indicates that the contextual variables do explain a significant proportion of the variance in sales and retained earnings. In both of these cases, the number of employees (size) is the most important influence. However, these variables are not good predictors of gross economic benefits. It thus appears that this variable—which represents, in effect, executive compensation—is the most context free of the performance criteria.

Table 3 displays the results of the regressions of the information processing variables on financial performance. After the influence of the contextual variables was removed, neither intolerance of ambiguity nor integrative complexity made a significant contribution to the explained variance in financial performance. Therefore, Hypotheses 3 and 4 are rejected.

Table 4 shows the results of the test of Hypothesis 5. The upper portion of the table indicates that boundary spanning as a percentage of time contributes significantly and positively to the variance in financial performance for sales and gross. The lower portion of the table indicates that the number

Table 3
Effects of Information Processing
Capability on Financial Performance

<i>Financial Performance (N)</i>	<i>R² Context Variables</i>	<i>R² with Information Processing</i>	<i>Sign of Beta Coefficient</i>	<i>F-Ratio of R² Increment</i>
<i>Intolerance of Ambiguity</i>				
Sales (54)	.41***	.44***	—	2.57
Retained earnings (50)	.31***	.35***	+	2.70
Gross (48)	.08	.09	—	.46
<i>Integrative Complexity</i>				
Sales (54)	.41***	.41***	—	.00
Retained earnings (50)	.31***	.32***	—	.68
Gross (48)	.08	.10	—	.93

* $p < .10$

** $p < .05$

*** $p < .01$

Table 4
Effects of Boundary Spanning Activity
on Financial Performance

<i>Financial Performance (N)</i>	<i>R² Context Variables</i>	<i>R² with Boundary Spanning</i>	<i>Sign of Beta Coefficient</i>	<i>F-Ratio of R² Increment</i>
<i>Boundary Spanning as a Percentage of Time</i>				
Sales (54)	.41***	.53***	+	8.17***
Retained earnings (50)	.31***	.31**		.00
Gross (48)	.08	.42***	+	24.62***
<i>Boundary Spanning Contacts</i>				
Sales (54)	.41***	.43***	+	1.68
Retained earnings (49)	.31***	.35***	+	2.65
Gross (48)	.08	.08		.00

* $p < .10$

** $p < .05$

*** $p < .01$

of boundary spanning contacts is a positive influence on sales and retained earnings but not at statistically significant levels. The conclusion is that boundary spanning activity is positively related to financial performance, and the hypothesis is accepted.

Hypotheses 6 and 7 posited a stronger relationship between financial performance and boundary spanning when the owner/operator possessed higher levels of information processing capability. These hypotheses were tested in two complementary procedures (Argote, 1982). The first method used a split sample technique (disjoint analysis). The sample was divided at the median values for intolerance of ambiguity and integrative complexity. The effects of the contextual factors were removed, and the partial correlation coefficients between boundary spanning and financial performance were calculated. These partial correlation coefficients then were compared for the high and low groups. The results are presented in Table 5.

The results shown in Table 5 are mixed. The relationship between boundary spanning contacts and financial performance (Table 5, II, IV) appear substantially unchanged by information processing capability. If a pattern

Table 5
Correlations Between Boundary Spanning Activity and
Financial Performance for High and Low
Information Processing Capability^a

	Intolerance of Ambiguity		
Financial Performance ($N_{H\cdot}$ $N_{L\cdot}$)	High	Low	Z^b
I. Boundary Spanning as a Percentage of Time			
Sales (26, 27)	.36**	.47***	.46
Retained earnings (26, 23)	.31	-.31	-2.10**
Gross (24, 23)	.08	.70***	2.52***
II. Boundary Spanning Contacts			
Sales (24, 27)	.20	.18	-.07
Retained earnings (24, 23)	.44***	.08	-1.25
Gross (23, 23)	.33	-.05	-1.24
Integrative Complexity			
Financial Performance ($N_{H\cdot}$ $N_{L\cdot}$)	High	Low	Z
III. Boundary Spanning as a Percentage of Time			
Sales (29, 24)	.43***	.44***	-.05
Retained earnings (26, 23)	-.16	.38**	-1.84**
Gross (25, 22)	.70***	.40**	1.42*
IV. Boundary Spanning Contacts			
Sales (29, 23)	.15	.36	-.76
Retained earnings (26, 21)	.31	.10	.70
Gross (25, 20)	.00	.07	-.22

^aThe correlations presented are the partial correlation coefficients between boundary spanning and financial performance after the variance due to the contextual variables has been removed.

^bPositive Z scores indicate that the correlations between boundary spanning and financial performance were greater under conditions of high information processing capability. Conversely, negative Z scores indicate that the correlations were greater under conditions of low information processing capability.

* $p < .10$

** $p < .05$

*** $p < .01$

emerges at all it is that the stronger boundary spanning contacts-performance relationships exist under low information processing capability (five of six signs are negative).

When boundary spanning as a percentage of time (intensive boundary spanning) is examined, significant relationships do emerge, but these are not consistent (Table 5, I, III). Low information processing capability seems to strengthen the boundary spanning-retained earnings relationship. High information processing capability seems to strengthen the boundary spanning-gross relationship. By itself, this test is inconclusive.

Table 6 presents the results of a moderated regression designed to test the incremental effects of the interaction of information processing capability and boundary spanning on financial performance. The contextual variables and main effects were regressed on performance (the additive model), and then the multiplicative interaction term was included in the regression (Kerlinger & Pedhazur, 1973).

This complementary test indicates that the strongest interaction occurs for boundary spanning as a percentage of time and gross. As before, information processing capability has little effect on the boundary spanning contacts-performance relationship. However, the inconsistent and unpredicted relationship between retained earnings and low information processing capability that emerged in the disjointive tests of Table 5 disappears in the conjointive tests of Table 6. The conclusion is that information processing capability does affect the boundary spanning (intensive type)-performance relationship (gross), and Hypotheses 6 and 7 are accepted.

Table 6
Effects of Information Processing Capability on Relationships
Between Boundary Spanning Activity and Financial Performance

<i>Financial Performance (N)</i>	<i>R² Main Effects^a</i>	<i>R² Main and Interaction Effects</i>	<i>F-Ratio of R² Increment</i>
<i>I. Intolerance of Ambiguity and Boundary Spanning as a Percentage of Time</i>			
Sales (54)	.55***	.55***	.00
Retained earnings (50)	.34***	.35***	.00
Gross (48)	.42***	.63***	22.70***
<i>II. Intolerance of Ambiguity and Boundary Spanning Contacts</i>			
Sales (54)	.46***	.46***	.00
Retained earnings (49)	.39***	.44***	3.66*
Gross (48)	.09	.09	.00
<i>III. Integrative Complexity and Boundary Spanning as a Percentage of Time</i>			
Sales (54)	.55***	.58***	3.28*
Retained earnings (50)	.33***	.33***	.00
Gross (48)	.47***	.57***	9.30***
<i>IV. Integrative Complexity and Boundary Spanning Contacts</i>			
Sales (54)	.44**	.44**	.00
Retained earnings (49)	.36***	.38***	1.32
Gross (48)	.10	.10	.00

^aMain effects include contextual variables as well as boundary spanning and information processing capability.

* $p < .10$

** $p < .05$

*** $p < .01$

Discussion

The results show that the strategic management process and environment/organization interaction is alive and well even in the microbusiness. The amount of boundary spanning performed by the owner/operator indicates that the strategic alignment and negotiation process is a continuing concern for the small business owner even though the goal structure and strategic plans are implicit. More importantly, this strategic action is significantly related to the performance of the firm and the compensation of the entrepreneur.

Of course, not all boundary spanning is of a strategic nature. Although the entrepreneur spends a considerable amount of time and energy performing boundary role functions, some of this activity is directed at sales, negotiating terms with suppliers, and other day-to-day operations. But even the pattern of these more prosaic activities is the consequence of strategic decisions: targeting a market or a customer need, securing sources of raw materials and supplies. This indicates that the implementation of the strategic plan (however implicit) is performed directly by the entrepreneur.

The implication for current and future small business owner/operators is that the role of strategic planner must not be neglected. Regardless of the criteria for performance, the owner/operator must be sensitive to constituencies in the environment. There clearly is a need to perform environmental analysis and personally engage those elements of the environment that provide opportunities or pose risks for the firm.

The second set of findings concerns the difference in the types of boundary spanning that may be engaged in. Katz and Kahn (1978) suggested that both intensity (amount of time spent in boundary spanning) and extensity (number of contacts) are important measures. However, it appears that although the measures are theoretically and empirically related, they represent different types of behavior and serve different functions.

First, the intensive type of boundary spanning activity (percentage of time) is positively and significantly related to two of three measures of financial performance. Between 12 percent and 34 percent of the increase in explained variance in performance can be attributed to intensive boundary spanning activity. Thus it appears that although intensive boundary spanning is related to the number of contacts ($r = .38$, $p < .001$), it is a more performance related activity. It would appear that the owner/operator, having evaluated the important constraints and contingencies imposed by the environment, concentrates energy on selected environmental elements that are perceived to contribute most to performance. These may be different for any individual owner/operator, but the processes in environmental analysis, problem identification, risk and opportunity evaluation, and resource commitment seem to take place. This would mean that some form of strategic management or planning can be imputed from the owner/operator's boundary spanning activity.

A second difference between the two types of boundary spanning is found in the effects of information processing capability on the boundary spanning-performance relationship. For the most part, information processing capability had no effect on the relationship between the number of boundary spanning contacts and financial performance. However, the information processing characteristic appears to be an important talent for the owner/operator when engaged in intensive boundary spanning (and thereby strategic action). This is especially relevant when the performance criterion is the personal economic benefits of the owner/operator (gross). The boundary spanning activity in the high integrative complexity group and the low intolerance of ambiguity group is strongly related to personal economic gain. When lower levels of information processing capability are present, the intensive boundary spanning-performance relationship declines.

There also are implications for the development, selection, and training of individuals who desire to become owner/operators. For individuals with greater information processing capacity and complexity, skills that increase competency for intensive boundary spanning could be sharpened. For the other individuals, nonboundary spanning, internally oriented skills may be most appropriate. The point here is that the individual with lower levels of information processing capability may contribute more to performance in certain routine boundary spanning situations (Kolchin, 1980).

The study found only weak support for the hypotheses concerning the effects of the information processing variables on boundary spanning and performance. The only significant zero-order correlations were between intensive boundary spanning and integrative complexity ($r = .21, p < .05$) and sale and intolerance of ambiguity ($r = -.29, p < .01$). However, when the effects of the contextual variables were included in the analysis, there was no statistically significant relationship between information processing capability and financial performance. Also, the low reliability of the intolerance of ambiguity instrument diminishes the interpretability of these findings. Therefore, it is necessary to look elsewhere for constructs that explain the variation in boundary spanning itself. Among the most commonly suggested have been the environment (Aldrich & Herker, 1977; Mindlin & Aldrich, 1975; Thompson, 1967), organizational structure (Leifer, 1975; Leifer & Delbecq, 1978), technology (Galbraith, 1977; Thompson, 1967), size (Child, 1973; Hall, 1967), or innovation (Rogers & Rogers, 1976; Tushman, 1977).

Summary

This research provides evidence of two important aspects of strategic management in small business organizations. The first conclusion is that entrepreneurial boundary spanning does exist in microbusinesses. It is clear that the entrepreneur is deeply involved in environmental action, an important aspect of strategic management.

The second conclusion is that this environmental action is strongly related to financial performance criteria. That is, boundary spanning in the strategic management of small firms provides the firm with an edge in the marketplace. This is the same conclusion that would arise from the study of large complex organizations.

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Modeling Strategic Acquisition Policies: A Simulation of Executives' Acquisition Decisions¹

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The acquisition policies of 42 executives were examined and were found to be individual or firm specific. The decision makers had poor insight into their own decision policies. Therefore, researchers must observe multiple decisions and calculate criterion importance rather than ask subjects to state their acquisition decision policies.

The analysis of corporate strategy and policy has advanced remarkably in the last 20 years since pioneering works (Ansoff, 1965; Chandler, 1962) were published. Recent papers (Anderson & Paine, 1978; Bourgeois, 1980; Bracker, 1980; Hambrick, 1980; Hofer, 1976; Mintzberg, 1978; Mitroff & Emshoff, 1979; Snow & Hambrick, 1980) have documented many of the advances made in the study of the business policy discipline.

As understanding of the overall policy field has progressed, several conceptual studies have been published that hypothesize the logic behind a currently popular specific corporate strategy, that is, acquisition. Many of the criteria behind mergers and acquisitions have been discussed (Ansoff, Avenier, Brandenburg, Portner, & Radosevich, 1971; Baker, Miller, & Ramsperger, 1981; Biggadike, 1979; Boulden, 1969; Cameron, 1977; Derkin-deren, 1977; Herman, 1976; Kumar, 1977; Nazem, 1981; Rappaport, 1979; Salter & Weinhold, 1978; Stotland, 1976). In general, the studies are normative in that they specify to the reader how a decision maker should make choices regarding acquisitions. No studies were found that described the actual acquisition decision making processes of the decision makers.

Recently, several (Hatten, 1979; Hofer & Schendel, 1978; Mintzberg, 1978; Shirley, 1982) have suggested that a way to analyze business policy is through a decision making framework. In other words, one can analyze

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business policy through an analysis of strategic decisions. Indeed, Hatten remarked:

Although quantitative policy research has mostly been descriptive, it has addressed strategic decision making from a preconceived notion of what should be done according to the normative dictates of our theory. But, is that what managers do? Why not work back from their judgment, explore strategic decision making as a personal and group process and develop new theory? (1979, p. 460)

Because a descriptive acquisition study was not found, a strategic decision making framework has merit, and multiple criteria are involved, the present researchers applied multiple criteria behavioral decision theory to model and describe the acquisition decision making process.

Behavioral decision theory has been widely used to study decision making. Extensive literature reviews may be found (Einhorn & Hogarth, 1981; Hammond, Rohrbaugh, Mumpower, & Adelman, 1977; Kaplan & Schwartz, 1975; Slovic & Lichtenstein, 1971; Slovic, Fischhoff, & Lichtenstein, 1977). Much of the research has focused on the construction of mathematical models of decision making behavior (Ashton, 1974; Christal, 1968; Dawes, 1979; Goldberg, 1968; Slovic, 1969; Zedeck & Kafry, 1977). In almost every instance, an additive linear model has adequately modeled the relationship between an individual's decisions and the criteria used to arrive at those decisions (Beach, 1967; Darlington, 1968; Dawes, 1979; Dawes & Corrigan, 1974; Hoffman, 1960; Laughlin, 1978).

Previous researchers have applied the following general linear model for decision making:

$$Y_j = \sum_{i=1}^n \beta_i X_{ij} \quad j=1, \dots, m. \quad (1)$$

Where Y_j = the decision.

β_i = the beta weight or importance attributed to information criterion X_{ij} . These beta weights are typically derived from regressing Y_j on X_{ij} .

X_{ij} = the information criterion.

In this study, the Y_j are the acquisition decisions, the X_{ij} are the criteria for acquisition and the β_i represent the importance attached to each of the criteria by a decision maker when deciding on acquisitions.

In the case of an orthogonally designed and orthogonally coded experiment, the beta weights can be transformed to relative weights (RW_i) by the following equation (Hoffman, 1960; Ward, 1962):

$$RW_i = \frac{\beta_i^2}{R^2} \quad i=1, \dots, n. \quad (2)$$

Where RW_i = the relative weight for criterion i .

β_i = the beta weight for criterion i .

R^2 = the square of the multiple correlation coefficient.

An advantage of this transformation is that by normalizing on each decision maker's R^2 , the RW_i sum to 1.0. By then multiplying the RW_i by 100, they sum to 100. This transformation to relative weights facilitates comparisons among decision makers and comparison with subjectively stated measures of criterion importance. Darlington (1968) refers to the relative weights as objective weights because they are objectively calculated from the person's decisions via regression analysis. Slovic and Lichtenstein's (1971) comprehensive review of information processing describes the comparison of the regression and subjective weights as a measure of insight into decision making style. Given that executives who make acquisition decisions communicate to other managers the decision criteria employed so that others can research information on the criteria, insight into criterion use becomes important.

Two major findings from the decision modeling literature are germane for this research. First, because of human limitations in processing information, most decision makers' policies can be represented by a few criteria (Newell & Simon, 1972; Slovic & Lichtenstein, 1971; Slovic et al., 1977). Second, studies have demonstrated that a linear model with additive terms, versus a model with interactive terms, accounts for nearly all of the explainable variance in descriptive models of decision making because few decision makers interactively process information (Slovic & Lichtenstein, 1971; Slovic et al., 1977). These two findings, plus the knowledge from the acquisition literature that acquisition decisions are based on multiple criteria, led the researchers to the two primary research objectives of this study. The first is to apply the behavioral decision theory multiple criteria modeling approach with an orthogonally designed experiment to model the acquisition decision making processes. The similarity or difference among the acquisition decision models is of great interest, given Hatten's (1979) cited remark concerning developing theory by analyzing decision making. The second objective is to examine the insight of the decision makers into their own acquisition decisions by comparing their relative (objective) weights with their subjective (stated) weights.

Method

Decision Making Exercise

Is it possible to determine the criteria used by executives when they are in the process of making the decisions as to whether a firm should be acquired? Without a doubt, it would be ideal to be present during the decision process. This, unfortunately, is seldom ever possible. For proprietary reasons, it is difficult to obtain data on actual multiple criteria acquisition decisions. One could ask the decision maker to recall his/her decision making process. However, Slovic and Lichtenstein (1971) reported in their classic literature review that most decision makers have rather poor insight into their own multiple criteria decision processes. Therefore, a decision making

exercise was constructed to simulate the acquisition decision process in this research. An advantage of such a methodological approach is that the researchers can incorporate a planned experimental design into the exercise and substantially control the information the participants incorporate into the decisions. Thus, acquisition policy differences among decision makers can be more easily highlighted.

This research assumes that an acquisition strategy consists of at least two major decisions. First, the firm decides to use acquisition as a strategy. This policy formulation decision is not the focus of this research. Second, the firm decides which candidate firm to acquire. This second decision may be regarded as policy implementation and is the focus of this study.

Six criteria were predominant in the previously cited acquisition literature (relative price earnings ratio, relative purchase price, anticipated discounted cash flow, relative market share, relative productive capacity, and vertical integration). This research does not claim that these six are the only acquisition criteria. There are obviously others. However, these are among the most popular and the cited decision modeling literature suggests that most decision makers process only a few criteria. The criteria were chosen to help examine the objectives of this research, that is, similarity among decision making processes and the insight of the decision makers.

Based on these criteria, a simulated acquisition decision exercise was constructed. The exercise was designed around a one-half replicate of a full factorial experimental design with the six criteria each at two levels for a total of 32 decisions per subject ($1/2 \times 2 \times 2 \times 2 \times 2 \times 2$). The one-half replicate was constructed by confounding the six-way interaction (Hicks, 1973). A fractional factorial was used to design an instrument of reasonable length and preserve the orthogonality of the criteria. Exhibit 1 contains an example from the acquisition decision exercise. Subsequent to the example candidate firm, 32 hypothetical candidate firms were randomly presented in the exercise. Each of the 32 candidate firms was like the example firm except for the levels of the criteria. The first, second, fourth, and fifth criteria were either HIGH or LOW. Cash flow was ADEQUATE or EXCELLENT. Vertical integration was NONE or SUBSTANTIAL. A copy of the entire exercise is available from the senior author.

After the 33 candidate firms were presented, the subjects were asked to indicate the relative importance they believed they placed on each of the six criteria by distributing 100 points among the six criteria. The most important criterion received the most points, and so on. These weights are often referred to as subjective weights (SW_i) in the behavioral decision theory literature (Schmitt & Levine, 1977). A comparison of the SW_i with the RW_i provides a measure of self-insight into decision making behavior (Slovic & Lichtenstein, 1971).

Because each subject provided 32 decisions, a regression equation was derived for each subject. The actual raw values of the decisions, which ranged from -5 to +5, were used in the regressions. Each subject's 32

Exhibit 1

Instructions for Acquisition Decision Making Exercise

This instrument consists of an acquisition decision making exercise. During the exercise, please assume that you are responsible for recommending approval or disapproval of candidate firms for acquisition. The only real differences in these firms are the extent to which six key attributes are involved with each of the candidate firms. Assume the firms do not differ on other attributes.

A sample firm is shown below.

Candidate Firm #0—Example

Relative Price Earnings Ratio. The ratio of the candidate firm's current market price to earnings for the last twelve months as a percent of your firm's P.E. ratio isLOW
Relative Purchase Price. The purchase price of the candidate firm as a percent of your firm's available cash and borrowing capacity isHIGH
Anticipated Discounted Cash Flow. The anticipated net after taxes discounted cash flow of the candidate firm for five years subsequent to the acquisition isEXCELLENT
Relative Market Share. The dollar volume of sales of the candidate firm as a percent of sales in that industry isLOW
Relative Productive Capacity. The productive capacity of the candidate firm as a percent of total production in that industry isHIGH
Vertical Integration. Proximity of the candidate firm to either your customers or resources isSUBSTANTIAL

Indicate your recommendation regarding approval or disapproval of this firm for acquisition.

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
Strongly Against Acquisition						Strongly Recommend Acquisition				

Please circle the number which best indicates your recommendation for this particular firm. Make each decision one at a time and independently of others. Do not change a decision once you have made it. Work at a brisk pace, but don't hurry your decisions. Please complete EVERY case, as each case is DIFFERENT.

Thank you for your cooperation.

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decisions were regressed on the criteria after the criteria were coded as +1(High) or -1(Low) to preserve orthogonality.

Subjects

The instrument was sent to executives at firms who had acquired another firm in the 18 months prior to this research. The names of the firms were identified from the *Mergers and Acquisitions* journal. The names of the executives were identified from *Moody's Industrial Manual* (1981) and *Value Line Investment Survey* (1981). In acquiring another firm in the past 18 months, it had been necessary for the executives to evaluate the criteria that they felt were most relevant in acquisitions.

Completing the exercise were 42 firms that had been identified in the *Mergers and Acquisitions* journal. The response of the firms was a pleasant surprise. Nearly all of the 42 firms exercised an option and identified themselves on the returned instrument and requested feedback of their model and the model of the entire sample. The firms ranged in size from \$100 million in sales to \$7 billion in sales. Included were 31 manufacturing and 11 service firms. The specific decision makers included 15 presidents and senior vice presidents, 24 heads of corporate development and planning,

6 treasurers or vice presidents for finance, and a few senior analysts. All of these top level decision makers had been involved in an acquisition within the past 18 months.

Results

The first step in analyzing the data was to check for the presence of interactions within the decision makers. Based on human limitations in processing data (Newell & Simon, 1972), only the 6 main effects and the 15 possible two-way interactions were examined. To check for the two-way interactions, a preliminary regression equation was computed for each subject's 32 decisions as a function of the 6 main effects and the 15 two-way effects. Of the 42 executives, 7 exhibited one significant two-way interaction. One exhibited two significant two-ways. The interactions were randomly distributed among all the possible 15 interactions: there was no preferred or consistent interaction. Even in the cases in which there was a statistically significant interaction, the additional explanatory power (increment in R^2) was only a few percentage points. Additionally, a group regression equation was computed with all 42 decision makers, 1,344 decisions, six mains and 15 two-ways. No significant interactions existed in the model of the 1,344 decisions. Because there was no preferred interaction, the increment in R^2 was small, and no group interaction exists, the remainder of the analysis is based on the six main effects for each individual regression equation. Therefore, the model tested for each subject was equation (1) where n (the number of independent variables) was 6 and m (the number of observations) was 32:

The second step in analyzing the data was to examine the reliability or internal consistency of the decision makers. This was done via an examination of the R^2 resulting from the individual regressions on the six main effects (Stahl & Harrell, 1981). An average R^2 of .80 and an R^2 range from .43 to 1 indicated that the decision makers were internally consistent in the application of their decision policies.

Table 1 contains the distributions of the relative weights for the 42 decision makers. Two major points are worthy of note in Table 1. First, the means indicate that there are three categories of criteria in terms of relative importance. Market share is by far the most important. It is almost double the weight of any other criterion. The second category of moderate importance is occupied by vertical integration, cash flow, and purchase price. Of almost negligible importance are productive capacity and P.E. ratio. Second, the variability in the decision models as measured by the variances and ranges on the relative weights is dramatic. The broad ranges resulting from some executives giving a criterion zero weight, yet others giving it almost exclusive importance, combined with the variances, are indicative of dramatic individual decision making differences. It appears that acquisition decision policies are firm specific or individual specific. The decision policies certainly are not universal.

Table 1
Distributions of Relative Weights^a
(N = 42)

Criteria	Mean	Variance	Minimum	Maximum
P.E. ratio	2.9	18.4	.0	22.0
Purchase price	16.1	666.7	.0	100.0
Cash flow	17.7	489.7	.0	92.0
Market share	36.7	965.3	.0	96.0
Productive capacity	5.1	87.6	.0	54.0
Vertical integration	21.4	653.8	.0	95.0

^aThe relative weights were multiplied by 100 to facilitate comparison with subjective weights.

As a further check on the different decision making policies, the group regression with 1,344 decisions and the 6 effects was computed. The group R^2 was .39, compared to the average individual R^2 of .80 from 42 separate regressions. Thus, a dramatic increase is seen in unexplained or error variation by fitting a common group model. This is further evidence of firm or individual specific acquisition decision policies.

To try to shed light on the specific decision policies, a comparison of demographic data with the acquisition decision policies was performed. Six of the executives were treasurers or vice presidents in finance. Two sample *t*-tests for these 6 versus the other 36 on the 6 criteria were performed. Of the executives, 24 were directors of corporate development or corporate planning. They were tested against the others in six two-sample *t* tests. Of the respondents, 15 were top level executives (chairman of the board, chief executive officer, president, or senior vice president). They were tested against the others. Of the firms in service industries, 11 were compared to the 31 firms in manufacturing industries. The size of the firm, as measured by number of employees and also by annual sales, was correlated with the six relative weights. None of these 12 correlations was statistically significant. Of the 24 *t*-tests that were computed, not one indicated a significant difference. Tests of treasurers/financiers versus others, planners/developers versus others, top level executives versus others, and service versus manufacturing all yielded no significant differences. In the absence of any relationships in the 12 correlations, and no differences in the 24 *t*-tests, the acquisition decision policies do indeed seem to be firm specific or individual specific.

The insight of the 42 executives into their own decision making policies was tested via a comparison of the relative and subjective weights. Table 2 contains the means on the six criteria for the relative and subjective weights. It also contains the results of a within-person comparison of the subjective and relative weights via six paired sample *t*-tests.

The significant differences noted in Table 2 follow a bias pattern noted by Slovic and Lichtenstein (1971). Their literature review consistently found that decision makers tend to understate the importance they claim to give to highly important criteria and to overstate the importance they claim to

Table 2
Comparison of Average Relative and Subjective Weights^a
(N = 42)

<i>Criteria</i>	<i>Relative Weight</i>	<i>Subjective Weight</i>	<i>t</i>
P.E. ratio	2.9	12.6	8.61**
Purchase price	16.1	19.3	1.02
Cash flow	17.7	24.1	2.13*
Market share	36.7	21.2	-4.19**
Productive capacity	5.1	9.9	4.28**
Vertical integration	21.4	12.9	-2.57*

^aThe relative weights were multiplied by 100 to facilitate comparison with subjective weights.

* $p < .05$, two tailed, paired sample t test.

** $p < .01$, two tailed, paired sample t test.

give to low importance criteria. This pattern is evident in the five significant paired sample t -tests between the subjective and relative weights. Slovic and Lichtenstein (1971) referred to the comparison of the subjective and relative weights as a measure of self-insight, that is, the closer the two, the more insightful the decision maker was to his/her own decision making style. These 42 decision makers did not demonstrate good insight. However, a lack of insight alone does not demonstrate which set of weights is superior.

To determine which set of weights is superior, the power of each set of weights in explaining the variance in the decisions was examined. The explanatory power of two models was compared. The first model is equation (1). The second model is equation (3), wherein the subjective weights (SW_i) have replaced the beta weights (β_i) from equation (1).

$$Y_j = \sum_{i=1}^n SW_i X_{ij} \quad j = 1, \dots, m. \quad (3)$$

The models were compared by using paired sample t -tests. The tests examined which model explained more of the variation in the decisions, person by person. The paired sample t -tests blocked on the individual decision makers and, thus, were within-person analyses.

Two paired sample t -tests compared the explanatory powers of the two models (Table 3). First, for each subject the squared multiple correlation coefficient (R^2) from 42 regressions was compared to the squared bivariate correlation coefficient (r^2) from the subjectively weighted model for each subject. Then for each subject the squared adjusted multiple correlation coefficient (R^2_{AD}) from the 42 regressions was compared to the squared population correlation coefficient (ρ^2) from the subjectively weighted model. The R^2_{AD} provided a conservative estimate of explained variation for the regression models. It is a measure of the variation explained by the regression, corrected for the number of variables in the regression (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). The R^2_{AD} is analogous to the

Table 3
Paired Sample *t*-Tests of Explained Variation

<i>Model</i>	<i>Average Explained Variation Sample (Population)^a</i>	<i>t</i>
$Y_j = \sum_{i=1}^6 (SW_i X_{ij})$	34 (.31) ^b	14.26* (12.68*)
$Y_j = \sum_{i=1}^6 (\beta_i X_{ij})$.80 (.75) ^c	

^aThe sample refers to the decisions provided by an individual for this research. The population refers to all the decisions that an individual could provide by completing the exercise several times. The averages are for all the subjects in this research.

^bAverages of the squared bivariate correlation coefficients between the acquisition decision and new variables computed as the sum expressed in the model column.

^cAverages of the squared multiple correlation coefficients derived from regressions of the decisions on the acquisition criteria.

* $p < .01$, $df = 40$

shrunk R^2 , which is an estimate of the variation explained by the regression in the population (Cohen & Cohen, 1975). After an extensive Monte Carlo evaluation of the problem of inflated estimates of R^2 , Schmitt, Coyle, and Rauschenberger (1977) recommended deriving regression weights from the entire sample and then using a formula to estimate the population R^2 rather than splitting the sample and performing a cross-validation to estimate the population R^2 . Cattin (1980a, 1980b) recently updated the Schmitt et al. (1977) research and offered the same recommendation. Similarly, the q^2 for the subjectively weighted model estimates the population explained variation (Cattin, 1980b). In this research, the population and the sample refer to the decisions of an individual, because R^2_{AD} and q^2 were derived for each individual. The sample decisions for an individual are the decisions provided by an individual in this research. The population for an individual refers to all decisions that that individual could theoretically provide by completing the exercise several times. The averages in Table 3 are for all the subjects in this research.

Both tests in Table 3 demonstrate that the objectively weighted model explains the decisions better than does the subjectively weighted model. This statement is true both before and after shrinkage from the sample to the population estimates. Not only did the decision makers have poor insight, but the subjective weights produced weak models.

Also completing the same exercise were 39 business policy professors. There was substantial variance among the professors on criterion importance. Also, the academicians exhibited a lack of insight into their acquisition decision making policies just as did the executives.

Discussion and Conclusion

After analyzing 1,344 corporate acquisition decisions of 42 executives who within the past 18 months had been involved with the acquisition of firms, several conclusions are offered.

First, executive decision making behavior on corporate acquisitions can be modeled with a high degree of consistency with an additive linear model via behavioral decision theory. This was shown by the lack of significant interaction and the average R^2 of .80 for the main effects model. Therefore, acquisition guideline checklists, which are common in acquisition cases, for example, White Motor (Steiner & Miner, 1977) and Dresser Industries (Thompson & Strickland, 1981), and which imply additive linear models, are better representations of those decision makers' decision processes than all or nothing lists that imply a multiplicative process. Additionally, this finding of representation via additive linear models coincides with much of the behavioral decision theory literature (Beach, 1967; Darlington, 1968; Dawes, 1979; Dawes & Corrigan, 1974; Hoffman, 1960; Laughlin, 1978).

Second, the high variances and wide ranges on the criterion relative weights imply that the acquisition checklists should be modified to weighted acquisition checklists. The behavior of these decision makers demonstrates that the criteria are not equally weighted. Unequally weighted checklists are more appropriate. Nor are the criteria uniformly weighted by all the decision makers. Some attached zero weight to a criterion, whereas others attached almost exclusive weight. The weights to be used in a weighted checklist should come from the CEO or the Board. The process whereby the CEO and/or the Board specifies the weights could be very valuable. It forces the executives to think through strategic acquisition policies without the distraction of a specific acquisition candidate. The resultant weights also provide staff members with guidance on what information about potential acquisitions is critical and what is noise.

Acquisition policies are individual or firm specific. For the theorist, the firm specific hypothesis implies that acquisition policies are the perfect example of adapting a policy to the organization's environment. If an acquisition policy is firm specific, then it should be updated over time to fit with the organization's environment. The lack of association between the demographics and the individual policies reinforces the individual specific nature of the policies. Perhaps the best way to test this firm versus individual specific hypothesis is to model the acquisition decisions of several relevant decision makers within each of several firms. A test for variance within and among firms would address the issue.

The individual or firm specific policies may be partly a function of the acquirer's position. Indeed, *relative* P.E. ratio, *relative* purchase price, and vertical integration were all explicitly defined relative to the acquirer in Exhibit 1. Cash flow is implicitly defined relative to the acquirer's concept of adequate or excellent. Relative market share and relative productive capacity are not defined relative to the acquirer's position: the candidate firm could be in a different industry. It is noteworthy that of the two criteria that received the two highest relative weights, that is, market share and vertical integration, one is defined relative to the acquirer and the other is not.

Third, all the prior comments about differences notwithstanding, there is a common theoretical financial thread that can be woven through the relative weights. Salter and Weinhold (1978) pointed out that acquisition is the correct strategy when such a move will result in a return higher than the risk adjusted cost of capital necessary to make the acquisition. They suggest that a company choosing acquisition as a strategy can create value for its shareholders "only when the combination of the skills and resources of the two businesses satisfies at least one of the following conditions: An income stream greater than what could be realized from a portfolio investment in the two companies. A reduction in the variability of the income stream greater than what could be realized from a portfolio investment in the two businesses—that is, reduced systematic risk" (1978, p. 171). Similarly, Naylor and Tapon (1982) argued that the capital asset pricing model (CAPM) could be used in acquisition analysis. Indeed, after describing the value of a company in terms of the rate of return and the variance (risk) of the rate of return, they specifically commented: "The problem of the firm under this formulation of the CAPM is to select a portfolio of businesses that maximizes the value of the company" (1982, p. 1168). Further on in their article, they remark that a company should strive for high returns and low variances of returns in building a portfolio of businesses. The two criteria that received the highest relative weights by executives in this study, that is, market share and vertical integration, support the CAPM concept of risk adjusted rate of return. Those two criteria work to improve profitability and to reduce the riskiness of returns in the long term. Hax and Majluf (1982) demonstrated how higher market share leads to higher cumulative volume, which in turn yields lower unit costs and thus higher profitability. Thompson and Strickland (1981) argued that vertical integration can increase profitability and reduce the risks of dealing with suppliers. Conversely, the two criteria that received the lowest relative weights, P.E. ratio and productive capacity, do little to effect the long term risk adjusted rate of return. Both criteria are relatively short term in nature. Therefore, the relative weights support the CAPM risk adjusted rate of return concept if viewed through a time phased lens.

The purpose of this research was not to test the CAPM. Rather, it was to model acquisition decision making processes. However, Naylor and Tapon (1982) described in CAPM terms how a firm should make acquisitions. Ross (1978) noted that although the attractiveness of the CAPM is due to its potential testability, no robust test of the theory had been performed as of 1978. As an area for further research, why not test the CAPM in a similar simulated acquisition decision making framework? Such a study would describe the candidate firms with criteria from the CAPM such as rate of return, variance of rate of return, and intercorrelation among businesses. Then the normative dictates of the CAPM could be tested, including the interactive or multiplicative relationship between the variance of the rate of return and the intercorrelation among the businesses.

The subjective weights in Table 2 do not support the CAPM risk adjusted rate of return concept as clearly as do the relative weights. The subjective weights are more uniformly distributed and thus lose the long run versus short run distinction seen in the relative weights. It appears that the executives were making correct decisions, at least according to the CAPM risk adjusted rate of return theory. However, they were unable or unwilling to verbalize the correct reasons in the subjective weights. This presents another reason to question the utility of the subjective weights. Therefore, merely asking executives what criteria are important in an acquisition study could be a problematic methodological approach. The acquisition decision process is not correctly or precisely modeled with subjective weights.

Fourth, the executives were making long term or strategic decisions. There was little evidence of their using acquisition as a short term or tactical device. Rappaport (1979) argued that acquiring a firm with a lower P.E. ratio than one's own can lead to the creating of instant stock value because the market suddenly values the combined earnings at the higher P.E. ratio. Because these executives valued P.E. ratio the lowest, they apparently used a longer term outlook in which they looked beyond the sudden change in combined valuations.

Fifth, the decision makers had poor insight into their own acquisition decision making processes. This was evidenced by five significant differences between what the decision makers said was important and what their decisions indicated was important in the relative weights. This coincides with the lack of insight reported by Slovic and Lichtenstein (1971) in their literature review. Nisbett and Wilson's (1977) more recent literature review indicates that one reason for the lack of insight is that people simply do not have recall access to that part of the brain dealing with processing multiple criterion decisions. The lack of insight implies that one cannot just ask an acquisition decision maker what is important because he or she may not be able to verbalize the answer accurately. Rather, one should observe multiple decisions and calculate importance. This methodological point is one of this paper's major conclusions. The regression weights explained more than twice the variance in the decisions than did the subjective weights; thus one must argue in favor of the decision modeling approach as a better methodology for measuring acquisition importance.

One also wonders if the reason why executives sometimes violate their own written acquisition guidelines—for example, White Motor and Heublein (Steiner & Miner, 1977)—is because they have little insight into their own multiple criterion decisions. White Motor is now bankrupt, and Heublein subsequently divested itself of its ill-advised acquisition. One thus must wonder how important insight into strategic decision making behavior becomes. Hofer and Schendel recently addressed this issue:

Both practice and theory indicate that no exact calculus yet exists by which strategic decisions can be made. Instead, effective strategy making relies on the creativity, judgment, and insights of the strategic decision maker (1978, p. 177).

Given that insight is so important and the decision makers in this research displayed such poor insight, one wonders if a form of cognitive feedback

(Hammond et al., 1977) might be appropriate. They suggested capturing the decision maker's model by analyzing his/her decisions and feeding back the model, as well as the model of other decision makers. In such a fashion, the individual can start to consider, with the aid of the decision analyst, the appropriateness of the various models, the lack of insight, and so on. The reader may recall that most of the subjects in this research exercised an option and were provided with such cognitive feedback. Maybe the analyst can help the decision maker to achieve better insight.

One must mention a shortcoming. Obviously, simulating decisions in a hypothetical decision making exercise is not quite as good as recording actual acquisition decisions. However, the pragmatics of observation and the demonstrated superiority over subjective weights indicate that simulating strategic decisions via behavioral decision theory is a promising methodological approach.

To the authors' knowledge, this is the first study of strategic acquisition via behavioral decision theory. If several (Hatten, 1979; Hofer & Schendel, 1978; Mintzberg, 1978; Shirley, 1982) are correct in their suggestions that a useful way to analyze business policy is via strategic decisions, then this acquisition decision modeling research may be the start of analyzing strategic policies by simulating strategic decision making behavior.

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A Comparison of Diversifying and Nondiversifying Australian Industrial Firms¹

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This paper examines corporate motives for diversification and compares the performance of diversifying and nondiversifying Australian industrial firms. No significant difference appears to exist in the profitability of the two groups of companies, and little difference exists in the risk faced by the two groups. Profitability, however, does appear to be related to the extent of diversification.

Diversification has become an increasingly important aspect of corporate strategy over the last three decades. Various reasons have been advanced for this development, including increased profitability, reduction in risk, increased competition, higher growth, and more efficient resource allocation. Many writers have sought to evaluate the success of corporate diversification in achieving these goals, especially in the United States. Generally, as the literature reviews of Needham (1978) and Mueller (1977) showed, there is no real consensus concerning the effects of diversification.

The objective of this paper is to test some commonly advanced hypotheses concerning the effects of diversification on corporate performance, using a sample of 108 Australian public companies. On a priori grounds, Australian companies could be expected to have diversified for different reasons, and with different results, than companies in the United States. For instance, Australian manufacturing markets generally are relatively small, and they have been heavily protected by tariffs and other barriers to imports. Also, Australia lacked effective antimerger legislation until 1974, and consequently firms were able to expand horizontally at will. This contrasts with the situation in the United States, where conglomerate mergers mushroomed in the 1960s and thereafter, partly as a result of more stringent attitudes taken in the enforcement of the amended Clayton Act.

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A general theory of diversification does not exist. Instead, the justification for such a corporate strategy appears to be based on three related themes. First, diversification may be related to profit maximizing behavior on the part of firms. It may enable a firm to obtain economic power and profits through, for example, predatory pricing behavior, the advantages of size per se, or the reduction of competition by removing potential rivals through conglomerate mergers. It also may enable a firm to achieve higher profits through economies of scale, or through the exploitation of complementarities in production, distribution, marketing, research and development, purchasing, finance, and management. Second, a strategy of diversification can be linked to managerial theories of the firm. Diversification provides opportunities for growth in profits, sales, and assets that are not possible through horizontal expansion. Third, diversification can be linked to risk reduction, with the object of the firm being the reduction of relative or total risk associated with a firm's earnings stream and the exploitation of related benefits.

Previous Studies

Research into the performance of diversified firms in the United States has tended to concentrate on the profitability, growth, and risk aspects of performance. Many of these studies have been based on firms diversifying through mergers and becoming so-called conglomerate firms, rather than through internal diversification.

Much of the research into the relationship between diversification and profitability appears to be contradictory. Based on accounting measures of profitability, Reid (1968), Prosper and Smith (1971), Holzmann, Copeland, and Hayya (1975) found conglomerates to be less profitable than nonconglomerates. Weston and Mansinghka (1971) found that conglomerates earned superior returns on net worth (although not statistically significant) and superior returns on total assets by the end of their selected time period, compared to nonconglomerates. Melicher and Rush (1973), however, found no difference in the performance of conglomerates and specialized firms in the basic industries abandoned by the conglomerates. In other studies, Boyle (1970) found that conglomerate firms tended to acquire firms with higher profits than those acquired by nonconglomerates; Lynch (1971) considered that conglomerates followed a policy of acquiring profitable firms with good management that could be retained; and Melicher and Rush (1974) found that conglomerates acquired firms significantly more profitable than themselves.

Weston, Smith and Shrieves (1972) compared the risk adjusted rate of return performance of conglomerates and mutual funds and found that the conglomerates outperformed the mutual funds. Mason and Goudzwaard (1976) compared the performance of conglomerates with portfolios based on stocks chosen to match the exact industries in which the conglomerates

operated, and they noted that the portfolios outperformed the conglomerates. Beattie (1980) examined the risk adjusted performance of a number of conglomerates and found neither superior nor inferior performance.

Some studies attempted to relate the extent of diversification, or the diversification strategy employed, to profitability. The U.S. Federal Trade Commission (1971) and Imel and Helmberger (1971) found that diversification tended to have a negative effect on rates of return. Carter (1977), however, considered that diversified firms outperformed their more specialized counterparts, a result he attributed to synergism arising from diversification. Rumelt (1974, 1977) related diversification strategies to performance and found that certain strategies (related-constrained and related-linked) outperformed other strategies. In a similar study, however, Bettis and Hall (1982) found no such relationship, and they attributed Rumelt's results to the impact of the pharmaceutical industry.

In respect to growth, Reid (1968) and Weston and Mansinghka (1971) found that conglomerates grew at a faster rate than did nonconglomerates. Weston and Mansinghka, however, did not consider this result to be particularly significant because it merely represented the extent of past merger activity by conglomerate firms.

Empirical studies of the relationship between diversification and risk also have tended to be contradictory. Westerfield (1970) found that increased diversification appeared to be associated with a reduction in systematic risk (the variability in rates of return because of variations in economic conditions); Melicher and Rush (1973) and Joehnk and Nielsen (1974) found that conglomerates had significantly higher systematic risk than did nonconglomerates; and Beattie (1980) observed no clear relationship between diversification and risk. Holzmann et al. (1975) examined risk characteristics derived from financial statements. They found that the variances of returns on assets were larger for nonconglomerates than for conglomerates, but the reverse applied in respect to variances of returns on equity. They argued that these results might be because of a difference in financial policies between the two groups. Bettis and Hall (1982), however, observed no relationship between variability of asset returns and diversification strategy adopted by firms. Diversification and possible risk reduction may enable a firm to increase financial leverage. Weston and Mansinghka (1971) and Prosper and Smith (1971) found conglomerates to be more highly levered than nonconglomerates. Mueller (1977), however, considered that the available empirical evidence indicated that the conglomerates had significantly higher leverage ratios than the nonconglomerates *before* they diversified, suggesting more aggressive expansion-oriented management than other firms.

Hypotheses on Diversification

Despite the sometimes conflicting results of past studies, some broad generalizations concerning diversification are possible. First, diversified or conglomerate firms do not appear to outperform nondiversified or

nonconglomerate firms in terms of return on assets. Second, diversified firms appear to earn a higher return on equity than do nondiversified firms. Third, diversified firms have higher levels of systematic risk than do nondiversified firms. Fourth, diversification does not seem to be related to a reduction in the level of operating or business risk. Fifth, diversified firms have higher levels of financial leverage than do nondiversified firms. Sixth, diversified firms have higher growth rates in assets, sales, and earnings. From these generalizations, a number of testable null hypotheses and associated alternative hypotheses may be developed:

H1. There is no difference in the performance of diversified and nondiversified firms when performance is measured in terms of return on total assets (RTA):

$$RTA_{ND} = RTA_D; H_A: RTA_{ND} \neq RTA_D.$$

H2. There is no difference in return on equity (RE) between the diversified and nondiversified firms:

$$RE_{ND} = RE_D; H_A: RE_{ND} < RE_D.$$

H3. There is no difference on average in business risk (BR) between the diversified and nondiversified firms:

$$BR_{ND} = BR_D; H_A: BR_{ND} < BR_D.$$

H4. There is no difference in leverage (L) between the diversified and nondiversified firms:

$$L_{ND} = L_D; H_A: L_{ND} < L_D.$$

H5. There is no difference in growth rates (G) for assets, sales and earnings between the diversified and nondiversified firms:

$$G_{ND} = G_D; H_A: G_{ND} < G_D.$$

The measures used to test these hypotheses are based on data contained in the published financial statements of the sample set of companies, as the available evidence suggests—see, for example, Solomons (1970); Foster (1978); and Gibson (1982)—that corporate management and external analysts pay particular attention to profitability and risk indicators determined from financial statements.

The two profitability ratios employed in this study are: Return on Total Assets = [Earnings (after tax) + Interest]/Total Assets; Return on Equity = Earnings (after tax)/Shareholders' Equity. The first ratio attempts to measure the total after-corporate tax return on the total capital invested in a firm by shareholders and lenders. The second ratio is a measure of the return

on shareholders' equity in a firm; it is a measure of the success of management in managing a firm on behalf of its shareholders.

Risk is measured in two ways. First, it is measured in terms of the relative variability of each profitability ratio, through the coefficient of variation. Second, it is measured as the relative variability in earnings before interest and tax (EBIT) and in earnings after tax (EAT). The coefficient of variation of EBIT measures operating or business risk, or the sensitivity of the firm's earnings stream to changes in sales, output and input prices relative to average EBIT. The coefficient of variation of EAT is a relative measure of business and financial risk. Financial risk is caused by the use of debt, which enables a firm to increase the return on equity ratio at the cost of introducing further variability in shareholders' returns.

The level of debt financing is measured by the following ratios:

Debt Ratio (1) = Total Debt/Total Assets;

Debt Ratio (2) = Interest Bearing Debt/Total Assets.

The first ratio measures the proportion of a firm's investment in its assets financed by debt. The second ratio measures the extent of usage of interest bearing debt in financing assets. This second ratio is a measure of the success of the firm in raising fixed interest debt.

The Sample Companies

The questionnaires asked for information on whether firms had diversified during the period 1968-1969 to 1977-1978, the proportion of firm sales in 1974-1975 and 1977-1978 attributable to diversification since 1968-1969, and the reasons for diversification. They were sent to the 269 industrial companies listed on the Sydney Stock Exchange as of December 1981. (These dates were chosen because they enable a comparison to be made in future research between firm-level data and published industry-level data on diversification.) A total of 108 replies were received, representing a response of 40.1 percent. Of the 113 industrial firms included in the "top 200" companies listed in order of market capitalization, 43 (38 percent) replied to the questionnaire. Similarly, of the top 50 industrial firms, 20 were respondents (40 percent).

Given that this study aims to compare the performance of diversifying and nondiversifying firms, it was thought appropriate to provide a reasonably broad definition of diversification in the questionnaire and to allow firms themselves to decide if they had diversified over the specific period. Indeed, Needham has pointed out that if the center of interest is the determinants (and effects) of diversification, "the appropriate concept of diversification is the one which is behaviorally significant, in the sense of the concept which decision-makers themselves consider in their decision-making" (1978, p. 204). Diversification was defined in the questionnaire as "the manufacture of new products and services using significantly different inputs from existing products and services, and/or selling to new industries." Of the 108 respondents, 63 considered that they had diversified;

45 considered that the relative mix of products/operations that existed in 1968-1969 had been maintained. Firms in both groups were widely spread over all two digit industry groups of the Australian Standard Industrial Classification (ASIC). The companies that had diversified since 1968-1969 are referred to as "diversifying" firms; the other responding companies are referred to as "nondiversifying" firms.

Characteristics of Diversifying Firms

In order to gain some indication of the extent of diversification, diversifying firms were asked for the percentages of their total sales in 1974-1975 and 1977-1978 that were attributable to diversification since 1968-1969. Table 1 shows that diversification rose from an average of 17.6 percent of sales in 1974-1975 to 23.6 percent in 1977-1978. Only 4 firms reduced their level of diversification in the second period; 19 effected no change. Of the 35 firms that increased their diversification levels, 19 did so by at most 10 percentage points, although 23 firms more than doubled their diversification levels. Clearly, increased diversification was an important firm strategy during the mid-1970s in Australia.

Table 1
Extent of Diversification by Diversifying Firms

Percent of Sales Due to Diversification	1974-1975 ^a		1977-1978 ^a	
	No. of Firms	Percent	No. of Firms	Percent
0	6	10.3	—	.0
1-20	34	58.6	29	49.2
21-40	11	19.0	21	35.5
41-60	4	6.9	8	13.6
61-80	—	.0	—	.0
81-100	3	5.2	1	1.7
Total	58		59	

^aThere were 5 firms in 1974-1975 and 4 firms in 1977-1978 that did not give information on the extent of their diversification.

In order to assist in the testing of the hypotheses, firms were provided with a checklist of 10 possible reasons for diversification and were asked to identify the major ones behind their decisions to diversify. The mean and median number of reasons given was 2.9. Only one-third of all diversified firms checked four or more reasons; the maximum number of reasons given was six. Only one reason for their diversification decision was given by 11 firms.

By far the most popular reasons for diversification were a "reduction in firm risk" (RSK) and "suitable opportunity arising" (OPP), both nominated by 46 firms, followed by "poor growth prospects in traditional markets" (GRO) (30 firms); "dissatisfaction with the profitability of traditional market investments" (PRF) (16); "strong cash flow from traditional

activities" (CFL) (13); "uncertainty concerning government policy" (GOV) (12); and "difficulties in maintaining market share in traditional markets" (MSH) (9). Of the 36 different combinations of reasons reported by firms, RSK appeared 29 times, GRO 22, OPP 21, PRF 12, and CLF 7 times. Clearly, the most common motivating factors behind firm diversification were RSK, GRO, and OPP. RSK and GRO may be thought of as "push" reasons for diversification (emanating from within the firm, forcing it to seek new horizons), and OPP may be regarded as a "pull" factor (originating outside the firm and attracting diversification).

Empirical Results

Diversifying and Nondiversifying Firms

In Table 2 the profitability of the diversifying (D) and nondiversifying (ND) companies is compared. The two subperiods were chosen for analysis because the Australian economy experienced different economic conditions during these periods. Boehm and Defris (1982) showed that 1968-1969 to 1974-1975 was characterized by a clear-cut, comparatively deep recession followed by a quick, clear-cut resurgence in economic activity, and during 1975-1976 to 1980-1981 there were a series of mini cycles imposed on a background of sluggish economic activity, presenting a more difficult period for companies. Average rates of return are shown for the two groups for each period, and the differences are assessed using *t* tests. Both groups earned exactly the same average rate of return on total assets over the entire period. The nondiversifying firms, however, performed slightly better than the diversifying firms in the first period and vice versa for the second period, although the differences are not statistically significant. The diversifying firms earned a slightly higher return on equity than did the nondiversifying firms. Again, the diversifying firms were outperformed in the early period, but in the second period the reverse situation applied. In neither

Table 2
An Analysis of the Profitability of Diversifying
and Nondiversifying Firms

Profitability Ratios	Average		<i>t</i>
	Nondiversifying	Diversifying	
<i>1968-1969 to 1980-1981</i>			
Return on total assets	7.22%	7.22%	-.01
Return on equity	9.85	10.38	-.57
<i>1968-1969 to 1974-1975</i>			
Return on total assets	6.69	6.41	.56
Return on equity	9.69	9.51	.16
<i>1975-1976 to 1980-1981</i>			
Return on total assets	7.76	7.98	-.42
Return on equity	9.96	11.10	-1.01

*No *t* values are significant.

period were the differences significant, however, and so it is not possible to reject either of the first two null hypotheses; the two groups did not display significantly different performance in terms of either profitability ratio. In addition, the relationship between firm size and profitability was examined. For both diversifying and nondiversifying firms in all periods, there was no significant difference in profitability between small and large firms (the cut-off point being the median firm size for the period).

These tests suggest that there may be no significant difference in the profitability of diversifying and nondiversifying firms, but it is worthwhile investigating the matter further in a multivariate context in order to try to isolate the effect of diversification per se on profitability. Using ordinary least squares, the two profitability ratios were regressed separately on four explanatory variables. The results for the years 1975-1976 to 1980-1981 only are presented here (the results for the other periods generally confirmed all the results obtained from the simple tests). The model is of the form

$$PR = f(D, TO, A, G)$$

where D = diversification, measured either by the extent to which a firm's sales in 1977-1978 were due to diversification undertaken since 1968-1969 (DA), or as a dummy variable (D), taking the value 1 when a firm classified itself as having diversified since 1968-1969, and 0 otherwise.

TO = "technical opportunity" of the industry(s) into which the firm is classified, taking the form of a dummy variable with the value 1 if the firm operated in the following ASIC two-digit industries: chemical, petroleum and coal products; nonmetallic mineral products; basic metal products; fabricated metal products; transport equipment; other machinery and equipment; and taking the value 0 if the firm operated in the following industries: food, beverages and tobacco; textiles; clothing and footwear; wood, wood products and furniture; paper, paper products, printing and publishing; other manufacturing.

A = average firm size over the period, measured by assets.

G = the compound rate of growth in assets over the period.

One would expect D , TO , and G to be positively linked with profitability, if the sign on A is indeterminant, given the many conflicting effects that size per se may have on profitability. The results are presented in Table 3. Equations 1 and 2 involve only the 59 diversified firms that provided data on the extent of their diversification. Equations 3 and 4 involve all 108 firms in the sample; a dummy variable is used here to measure whether a firm has diversified or not. With the exception of the coefficients on diversification, there is very close agreement (compare equations 1 and 3, 2 and 4) between the regressions based on differing firm numbers, and also between the results based on the two different profitability measures. Technological opportunity and growth have consistent, highly significant positive

Table 3
Regression of Profitability on Explanatory Variables

Equation Number	n	Dependent Variable	Constant	Diversification		Technical Opportunity	Assets	Growth	\bar{R}^2	F
				DA	DD					
1	59	Return on equity	2.499 (1.845)*	.064 (2.236)**		3.164 (2.955)***	-130×10^{-5} (-1.464)	.330 (6.531)***	.49	14.7***
2	59	Return on total assets	4.290 (5.916)***	.025 (1.595)*		1.717 (2.996)***	-692×10^{-6} (-1.460)	.134 (4.935)***	.37	9.6***
3	108	Return on equity	4.234 (4.365)***		-.459 (-.500)	2.393 (2.656)***	-139×10^{-5} (-1.412)	.376 (8.333)***	.40	19.1***
4	108	Return on total assets	5.352 (10.809)***		-.501 (-1.070)	1.408 (3.061)***	-756×10^{-6} (-1.505)	.146 (6.321)***	.29	12.1***

* $p < .10$ ** $p < .05$ *** $p < .01$

effects on profitability, and firm size is consistently negatively linked with profitability, although a little short of significance at the 10 percent level (a two-tail test is used on this variable).

For the larger sample, the coefficients on the dummy variable representing diversification are negative but not significant, suggesting that although some nondiversifying firms may have enjoyed higher profitability than some diversifying firms, the difference is not significant. This result, obtained after allowing for the effect of other influences on profitability, is not inconsistent with the results in Table 2, which suggested that diversifying firms may have experienced higher levels of profitability; neither result is statistically significant. It is concluded, therefore, that diversifying and nondiversifying firms have not experienced significantly different profit rates in Australia.

However, considering just diversifying firms (equations 1 and 2), higher actual levels of diversification are associated with higher profitability, and this relationship is significant at least at the 10 percent level. This suggests that highly diversified firms are more profitable than less diversified firms in the group of diversifying firms; and it suggests that a major reason for the lack of a significant difference in profitability between diversifying and nondiversifying firms could be the relatively depressed profitability performance of firms that have undertaken only modest amounts of diversification. Whether this is because of learning problems, poor management skills, or too ambitious horizons being sought, remains open to question.

Table 4 presents the variability in the profitability ratios, and in the earnings measures. Variability is measured by the coefficient of variation of

Table 4
Variability of Profitability Ratios and Earnings

	Coefficient of Variation		
	Nondiversifying	Diversifying	t
<i>Profitability Ratios</i>			
<i>1968-1969 to 1980-1981</i>			
Return on total assets	48.12%	34.65%	1.08
Return on equity	231.76	39.94	1.69*
<i>1968-1969 to 1974-1975</i>			
Return on total assets	43.36	30.19	1.22
Return on equity	74.95	32.00	1.92*
<i>1975-1976 to 1980-1981</i>			
Return on total assets	130.88	19.04	1.90*
Return on equity	66.40	25.16	2.34**
<i>Earnings</i>			
<i>1968-1969 to 1980-1981</i>			
Earnings before interest and tax	73.91	62.96	1.60
Earnings after tax	107.06	71.48	2.16**
<i>1968-1969 to 1974-1975</i>			
Earnings before interest and tax	48.93	46.76	.23
Earnings after tax	67.22	107.20	-.53
<i>1975-1976 to 1980-1981</i>			
Earnings before interest and tax	70.31	39.83	1.94*
Earnings after tax	183.15	59.13	1.47

* $p < .10$

** $p < .05$

each of these variables. Generally, although there does not appear to be a strongly significant difference in risk between the two groups of firms over the whole period, the evidence suggests that the diversifying firms experienced less variability in the period 1975-1976 to 1980-1981 than did the nondiversifying firms, especially when variability in return on equity is considered.

Table 5
A Comparison of the Capital Structures of Diversifying and Nondiversifying Firms

	<i>Nondiversifying</i>	<i>Diversifying</i>	<i>t</i>
<i>Debt/total assets</i>			
1968-1969 to 1980-1981	43.98%	47.01%	-1.56*
1968-1969 to 1974-1975	42.18	45.59	-1.55*
1975-1976 to 1980-1981	46.06	48.83	-1.44*
<i>Interest bearing debt/total assets</i>			
1968-1969 to 1980-1981	19.08	20.96	-1.03
1968-1969 to 1974-1975	18.89	20.66	-.86
1975-1976 to 1980-1981	19.32	21.39	-1.11

* $p < .10$

The capital structures of the two groups are compared in Table 5. The average level of leverage is high for both groups and appears to have increased. Diversifying firms on average used debt to a significantly greater extent than did the nondiversifying firms. Similarly, the diversifying firms used more interest bearing debt on average than did the nondiversifying firms, but the difference is not significant. Overall, the differences in leverage are small and do not provide really strong evidence with which to reject, with a high level of confidence, the null hypothesis that there is no significant difference in leverage between the two groups.

Table 6 compares growth rates for the two groups. The diversifying firms appear to have achieved a considerably higher rate of growth in earnings after tax than the nondiversifying firms, especially in the second subperiod. Diversifying firms achieved higher growth rates in total assets, also, although the differences are not as great as for earnings. In respect to both assets and market capitalization, the diversifying firms grew significantly faster than did nondiversifying firms in the second subperiod only. Both groups increased their average return on total assets over the entire period, with the diversifying firms achieving a higher growth rate, although the difference is not significant. Particularly noticeable is the high growth rate in this ratio for the diversifying firms during 1975-1976 to 1980-1981, when nondiversifying firms experienced a negative growth rate. This latter group appears to have experienced negative growth in the return on equity ratio in both subperiods. The diversifying firms also experienced negative growth in this ratio in the first subperiod, but strong growth occurred in the second subperiod. Overall, the diversifying firms' superior growth rates in profitability probably reflect the strong growth in earnings, particularly during

Table 6
A Comparison of the Compound Rates of Growth in Earnings,
Assets, Market Capitalization, and Profitability Ratios of
the Diversifying and Nondiversifying Firms

	<i>Nondiversifying</i>	<i>Diversifying</i>	<i>t</i>
<i>1968-1969 to 1980-1981</i>			
Earnings after tax	11.65%	16.25%	-1.38*
Total assets	13.12	15.15	-1.53*
Market capitalization	9.78	14.14	-2.01**
Return on total assets	1.69	2.24	-.52
Return on equity	.18	1.32	-.89
<i>1968-1969 to 1974-1975</i>			
Earnings after tax	10.55	14.73	-.43
Total assets	14.59	15.72	-.53
Market capitalization	.43	.28	.07
Return on total assets	.46	1.55	-.49
Return on equity	-2.43	-1.22	-.43
<i>1975-1976 to 1980-1981</i>			
Earnings after tax	10.62	33.40	-2.36***
Total assets	12.79	15.93	-1.67**
Market capitalization	18.52	24.97	-2.30**
Return on total assets	-.15	4.03	-1.89**
Return on equity	-1.39	7.74	-2.71***

* $p < .10$ ** $p < .05$ *** $p < .01$

1975-1976 to 1980-1981, rather than differences in leverage. Clearly, the null hypothesis concerning growth rates can be rejected; the diversifying firms generally achieved higher rates of growth in profitability and size variables than did the nondiversifying firms, especially in the second subperiod.

Technological Differences

When comparing the performance of firms in different industries, it is possible that differences in industry characteristics may mask differences in performance because of the factor under consideration (in this case, differences in diversification). Accordingly, firms were grouped into industries in which technological opportunity was relatively high (those taking the TO variable value of 1) and those that were less technologically advanced. A decisive pattern emerged in the results, as may be seen from Table 7.

Diversifying firms in the technologically advanced industries earned significantly higher profit rates in all time periods, compared with diversifying firms in industries with less technological opportunities, and generally enjoyed lower relative variability of profit rates. In contrast, no such significant differences were observed when a similar comparison was made for nondiversifying firms. It appears that nondiversified firms do equally well in their specialized field(s), whatever that may be. Diversified firms, in contrast, seem to perform better in industries in which the possibilities for initiative, skill, and so on, are present. This is supported by a further comparison of the profit rates of diversifying and nondiversifying firms in industries designated as being characterized by technological opportunity.

Table 7
A Comparison of Profitability in Technological Opportunity Industries with Profitability in Other Industries

Profitability Ratios	Average			Coefficient of Variation		
	Technological Opportunity Industries	Other Industries	t	Technological Opportunity Industries	Other Industries	t
<i>Diversifying Firms</i>						
1968-1969 to 1980-1981						
Return on total assets	7.63%	6.35%	2.08**	27.36%	51.13%	-1.35*
Return on equity	11.45	8.12	2.73***	30.91	60.99	-1.74**
1968-1969 to 1974-1975						
Return on total assets	6.71	5.74	1.40*	33.06	23.11	.69
Return on equity	10.65	7.06	2.45***	30.66	35.25	-.54
1975-1976 to 1980-1981						
Return on total assets	8.52	6.82	2.59***	17.18	23.26	-1.53*
Return on equity	12.15	8.89	2.36**	25.36	24.68	.14
<i>Nondiversifying Firms</i>						
1968-1969 to 1980-1981						
Return on total assets	7.14	7.27	-.18	44.05	51.09	-.37
Return on equity	9.84	9.86	-.01	178.95	269.79	-.33
1968-1969 to 1974-1975						
Return on total assets	6.33	6.97	-.76	53.31	35.80	.97
Return on equity	9.64	9.73	-.05	101.90	56.29	.89
1975-1976 to 1980-1981						
Return on total assets	8.07	7.53	.60	41.17	196.44	-1.11
Return on equity	10.01	9.93	.04	90.12	49.90	.92

* $p < .10$ ** $p < .05$ *** $p < .01$

Table 8
A Comparison of Profitability of Diversifying and Nondiversifying Firms in Technological Opportunity Industries

Profitability Ratios	Average			Coefficient of Variation		
	Non-diversifying	Diversifying	t	Non-diversifying	Diversifying	t
1968-1969 to 1980-1981						
Return on total assets	7.14%	7.63%	-.94	44.05%	27.36%	2.44***
Return on equity	9.84	11.45	-1.62*	178.95	30.91	1.92**
1968-1969 to 1974-1975						
Return on total assets	6.33	6.71	-.65	53.31	33.06	1.11
Return on equity	9.64	10.65	-.87	101.90	30.66	1.85**
1975-1976 to 1980-1981						
Return on total assets	8.07	8.52	-.77	41.17	17.18	2.92***
Return on equity	10.01	12.15	-1.72**	90.12	25.36	2.55***

* $p < .10$ ** $p < .05$ *** $p < .01$

As Table 8 shows, diversifying firms tended to outperform nondiversifying firms, especially when performance is measured as the return on equity, at the same time achieving significantly lower variability of returns. Clearly, the combination of technological opportunities and diversifying firms can lead to highly favorable results.

Conclusions

The results indicate that a strategy of diversification since 1968-1969 generally has not resulted in significantly higher profitability or lower risk for the diversifying firms, compared to nondiversifying firms. It does appear, however, that the diversifying firms outperformed the nondiversifying firms in the second subperiod, which was a period of fluctuating economic activity. Within the diversifying group, there appears to be a positive relationship between profitability and the extent of diversification. The diversifying firms clearly achieved a higher growth rate than the nondiversifying firms in profitability and size. These findings are consistent with most previous studies concerning the strong relationship between diversification and growth and also consistent with some studies in respect to the relationship among diversification, profitability, and risk.

The findings raise serious questions concerning the justification of a strategy of diversification and indicate some divergence between corporate motives for diversification and overall results. Clearly, these aspects require further research. Nevertheless, three general explanations may account for the results. First, diversifying firms may have placed greater emphasis on growth than on other performance parameters. Diversification may have been viewed as a means of overcoming the limitations of small markets with low growth rates typical in Australia. Second, diversification expectations may not have been realized because of poor quality management and difficulties encountered in coping with new products and in capturing sufficient market share in markets dominated by specialized firms. Third, the costs of a strategy of diversification could have been greater than expected. Competition among firms for suitable diversification opportunities (especially through mergers) may have resulted in higher costs than were justified. In addition, an ability to achieve expected scale economies, and the existence of market imperfections, such as transactions costs and government regulation (especially in respect to tariff policy), may have influenced the profitability and risk effects of a policy of diversification.

Certain aspects of diversification, however, appear to have been favorable. The results provide some tentative evidence that diversifying firms may have performed better than nondiversifying firms under more difficult economic conditions and that technologically based diversification appears to have resulted in superior performance.

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Strategic Decision Processes: Comprehensiveness and Performance in an Industry with an Unstable Environment

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Comprehensiveness is a measure of rationality and is defined as the extent to which organizations attempt to be exhaustive or inclusive in making and integrating strategic decisions. Results from an industry with an unstable environment indicate a consistently negative relationship between comprehensiveness and performance. Limitations and extensions are discussed.

The processes used by organizations to make and integrate "strategic" decisions are increasingly identified as critical to their performance. However, it is widely recognized that knowledge of strategic processes is normative or descriptive and remains untested (Bourgeois, 1980; Cosier, 1981; Mintzberg, 1978). For example, the value of using a "comprehensive" process to make and integrate strategic decisions has been debated in the literature for years and is still unresolved. This paper reports the results of a research effort that tested the relationship between the comprehensiveness of strategic decision processes and performance in an industry whose environment is unstable.

Theoretical Development

Organization Strategy

The most frequently cited definitions of organization strategy are provided by Andrews (1971) and Chandler (1962) and emphasize concepts such as goals, resource allocations, and plans. As a result of this view, an organization's strategy historically has been thought of as an integrated "plan,"

and statistically verifiable research often has been limited to comparisons between firms that are classified as "formal" and "informal" planners (Grinyer & Norburn, 1975; Herold, 1972; Karger & Malik, 1975; Kudla, 1980; Leontiades & Tezel, 1980; Scheehan, 1975; Thune & House, 1970; Wood & LaForge, 1979). However, such an approach reveals very little about what actually occurs during the strategic process.

An organization's strategy illustrates the extent of match or alignment between its external environment and its internal structure and processes (Galbraith & Nathanson, 1978; Grant & King, 1979; Hofer & Schendel, 1978; Jemison, 1981; Miles & Snow, 1978; Mintzberg, 1978; Snow & Hambrick, 1980; Summer, 1980). The degree of alignment may be the result of an integrated strategy that was produced by a formal planning system, but more likely it reflects the impact of countless strategic decisions that have been made, *one at a time*, over a period of years (Mintzberg, 1978; Quinn, 1980; Uyterhoeven, Ackerman, & Rosenblum, 1977). This perspective suggests that strategy formulation is primarily a *decision making* process and that a more productive research approach may be to study how organizations make individual (i.e., single) strategic decisions and whether they attempt to integrate those decisions into some overall strategy. Therefore, because all firms make strategic decisions, it seems appropriate to move from a "plan" to a "decision-based" view of strategy because the population of potential research sites is almost limitless and the processes used to make and integrate individual strategic decisions can be studied using a variety of methodologies.

It is important to emphasize that in the decision-based perspective advocated above, the strategic decision process is an organization-level phenomenon. It is suggested that strategic decision processes are *patterns of behavior* that develop in organizations, and as such can "withstand the turnover of personnel as well as some variation in the actual behaviors people contribute. It is the persistence of the pattern through contributions made by interchangeable people that distinguishes organizations from other collectivities" (Weick, 1979, p. 34). Similarly, though patterns of decision making may change as organizations evolve (Perrow, 1961), evidence suggests that organization patterns tend to outlive their founders (Weick & Gilfillan, 1971), persist in the face of new leadership (Berkowitz, 1956), and become self-perpetuating (Allison, 1971; Cyert & March, 1963; Steinbruner, 1974). It is suggested that, as a pattern of organization behavior, a firm's strategic process is visible to its executive-level members and that the characteristics of that process tend to be consistent across decisions that are perceived as clearly strategic. As a result of this consistency, it is possible to study strategic process issues without studying an endless number of decisions at any given time. Several of the most critical issues become apparent when the dominant strategic process models are compared with the most recognized alternative.

Strategic Process Questions

Two types of models pervade the literature on strategy formulation. The most common type, often referred to as "synoptic," characterizes the strategic process as a highly rational, proactive process that involves activities such as establishing goals, monitoring the environment, assessing internal capabilities, searching for and evaluating alternative actions, and developing an integrated plan to achieve the goals (Andrews, 1971; Ansoff, 1965; Grant & King, 1982; Hofer & Schendel, 1978; Lorange & Vancil, 1977; Steiner, 1979; Thompson & Strickland, 1978). In contrast to the synoptic is a group of "incremental" processes (Braybrooke & Lindblom, 1970; Lindblom, 1959, 1979; Mintzberg, 1973; Quinn, 1980; Steinbruner, 1974; Wrapp, 1967) that often are offered as alternatives or as simply a more accurate characterization of how organizations actually make strategic decisions.

As illustrated in Table 1, a comparison of synoptic and incremental strategy processes suggests that they differ on at least six major characteristics. These two approaches are the most frequently cited in literature on strategy formulation, and it is suggested that their differences should provide the focus for research on strategic decision processes. Therefore, investigators can make major contributions if they employ a "decision-based" perspective, which focuses on individual (i.e., single) strategic decisions, to answer questions about: (1) what initiates the process, (2) the role played by goals, (3) the relationship between means and ends, (4) the concept of choice, (5) how comprehensive organizations are in making individual strategic decisions, and (6) how comprehensive they are in integrating those decisions into an overall strategy. However, for the reasons discussed below, it is the authors' opinion that the comprehensiveness questions should receive priority.

Comprehensiveness

The most basic feature of synoptic models is the emphasis placed on being "comprehensive" in making and integrating strategic decisions—the analytic and integrative comprehensiveness characteristics (numbers 5 and 6) presented in Table 1. Proponents of synoptic models argue that strategic decision making at the organization level should approximate the rational-economic model by attempting to be exhaustive in a variety of decision activities, including the conscious integration of individual decisions to insure that they form a consistent whole. Although the comprehensiveness construct is just *one measure* of the extent to which an organization's strategic process approximates a rational model, its multifaceted nature makes it particularly valuable in understanding strategic decision making.

For example, Janis and Mann (1977) have pointed out that this construct involves a multitude of behaviors. Their review of the decision making literature led them to conclude that a comprehensive process is characterized by: (1) the thorough canvassing of a wide range of alternatives; (2) surveying

Table 1
Differences Between Synoptic and Incremental Strategic Decision Processes^a

<i>Characteristic</i>	<i>Synoptic Processes</i>	<i>Incremental Processes</i>
1. Motive for initiation	The process is initiated in response to problems or opportunities that appear during constant surveillance.	The process is initiated in response to a problem or dissatisfaction with the current state.
2. Concept of goals	It is directed at achieving a specified goal or future intended state.	It is directed at achieving a modification of the current state. The process is "remedial."
3. Relationship between means (alternatives) and ends (goals)	The goal is identified before and independent of the analysis of alternatives. Decision making is an "ends-means" process.	The remedial change outcome is considered at the same time as the means for achieving it is analyzed. The processes are intertwined and simultaneous.
4. Concept of choice	The final choice of an alternative is dependent on how it contributes to the achievement of the goal. Decision quality is known only when it is shown that this decision provides the best means to the specified goal.	The final choice of an alternative is made by combining the considered alternatives (means) and their possible consequences (ends) and simultaneously selecting the one that yields the most desired outcome. Decision quality is judged by the agreement achieved in choosing an alternative (the means to the end).
5. Analytic comprehensiveness	When making individual decisions it attempts to be exhaustive in the identification and selection of goals and the generation and evaluation of alternatives. All factors are considered.	When making individual decisions it considers only a few alternatives to the status quo as alternative actions and only a restricted range of consequences in their evaluation. All possible factors are not considered.
6. Integrative comprehensiveness	Conscious attempts are made to integrate the decisions that compose the overall strategy to insure that they reinforce one another. The strategy is viewed as a consciously developed, integrated whole.	Little attempt is made to integrate consciously the individual decisions that could possibly affect one another. The strategy is viewed as a loosely linked group of decisions that are handled individually.

^aDeveloped by the first author from similar summaries presented by numerous contributors, particularly Lindblom (1959) and Mintzberg (1973).

a full range of objectives; (3) carefully weighing the costs and risks of various consequences; (4) intensively searching for information to evaluate alternative actions; (5) objectively evaluating information, or expert judgment regarding alternative actions; (6) reexamining the positive and negative consequences of all known alternatives; and (7) making detailed plans, including the explicit consideration of contingencies, for implementing the chosen action. Wrapp (1967) has provided a similar, multifaceted characterization, which led the present authors to define the comprehensiveness construct as follows: *the extent to which an organization attempts to be exhaustive or inclusive in making and integrating strategic decisions.*

The comprehensiveness construct was chosen for study because it is an important issue in the strategic decision making literature, and few empirical results are available that utilize this construct. As pointed out initially in Table 1, comprehensiveness is a major characteristic of the dominant

synoptic models of strategy formulation and one on which the synoptic differs from the incremental alternative. In addition, it is the synoptic process's requirement for comprehensiveness in making and integrating strategic decisions that receives the most criticism in the theoretical literature. As the next section indicates, authors in fields such as strategic management, individual behavior, organization theory, and public policy have presented arguments that question the reality and advisability of comprehensive decision processes, particularly in some settings.

Criticisms of Comprehensiveness

Comprehensiveness appears in synoptic strategy formulation models as a call to be exhaustive or inclusive in a variety of decision activities. However, Wheelwright (1973) has pointed out that individuals and organizations have limitations that have led scholars to question this requirement. For example, the bounded rationality necessitated by individuals' cognitive limits has been used to explain why organizations are noncomprehensive in making "satisficing" choices, and to describe how they "learn" (Cyert & March, 1963).

Because most models of individual, group, and organization decision making are very similar (Lang, Dittrich, & White, 1978), it should be noted that many contributions that question the comprehensiveness of organization-level decision making are based on well-documented work with individuals. Steinbruner (1974) has illustrated this point by describing how the characteristics of his organization-level model are consistent with a variety of cognitive theory principles that describe a noncomprehensive decision process. Similarly, numerous experiments like those of Bruner, Goode-nough, and Austin (1956) support theoretical arguments regarding the human tendency to simplify (Braybrooke & Lindblom, 1970; Summer, 1959).

In addition to problems of cognitive capacity, the comprehensiveness requirements of synoptic decision processes may tax other resources. For example, it has been argued that rational models assume that information will be available when needed but ignore the costs of obtaining it (Braybrooke & Lindblom, 1970; Summer, 1959). This same perception led Aharoni (1966), and more recently Bourgeois (1981) and Litschert and Bonham (1978), to theorize that the presence of organization slack will have a major impact on strategic processes. However, even if an organization has significant resources, it has been suggested that attempting to be comprehensive may result in "achieving tomorrow's solution to yesterday's problem" (Braybrooke & Lindblom, 1970, p. 121).

In synoptic models of strategy formulation, individual strategic decisions are consciously integrated into some overall strategy—a characteristic referred to in Table 1 (number 6) as integrative comprehensiveness. Hambrick and Snow have articulated the logic behind this requirement by declaring that "because of their importance, strategic decisions must be closely

linked to each other to form a consistent pattern for unifying and directing the organization" (1977, p. 109). Therefore, executives are encouraged to implement strategic planning systems, and organization strategy generally has been viewed as a "gestalt" (Mintzberg, 1978). However, the intuitive appeal of comprehensive integration has been challenged by several authors.

For example, Ansoff (1979) has argued that increased environmental change has made it impossible to achieve the level of integration demanded by most strategic planning systems, and his assessment is supported by Murray's (1978) work. Similarly, issues of integration led Mintzberg (1978) to argue that strategic decision processes are more accurately characterized as a process of *formation* instead of *formulation*. However, no contribution raises as many questions about integrative comprehensiveness as Quinn's observation that "it is virtually impossible for a manager to orchestrate all internal decisions, external environmental events, behavioral and power relationships, technical and informational needs, and actions of intelligent opponents so that they come together at a precise moment" (1978, p. 17). However, although the literature is filled with controversy regarding the reality and desirability of comprehensive decision processes, several contributors have argued that it is not an "either/or" issue. Rather, appropriateness of such processes depends on the setting.

Hypothesis

Thompson (1967) has argued that organizations are expected to act rationally and that they try to reduce the uncertainty that threatens rationality. The environment is a major threat to rationality and also is a critical factor in the manager's effort to achieve a strategic match or alignment. Therefore, the environment and the strategic decision process are concepts that are closely linked (Bourgeois, 1980), with the environment often appearing in the strategic process literature as a hypothesized contingency.

Uncertainty has been defined as the difference between the information needed to perform a task and the information available (Galbraith, 1973). Therefore, the environment can increase or decrease uncertainty (and the possibility of achieving a high level of rationality) by providing or withholding needed information. Regarding organization decision making, a number of authors (Aldrich, 1979; Nutt, 1976; Thompson, 1967) have argued that the environment creates a problem if critical decision variables are not readily apparent and, more importantly, when it is difficult to develop an understanding of the cause and effect relationships among those variables. As a result, though environments have been characterized on a variety of dimensions, the degree of stability is the one most often identified as affecting the decision process (Duncan, 1972). A stable environment increases the likelihood that the critical variables can be identified, and it allows theory to be developed regarding the relationships between those variables and the organization. On the other hand, a highly unstable

environment makes it difficult to achieve the level of certainty sought by rational models.

The above argument has been addressed in the strategy formulation literature by several authors (Anderson & Paine, 1975; Hatten & Schendel, 1976; Mintzberg, 1973; Nutt, 1976) who suggest that synoptic processes, which are based on a rational model, are appropriate for organizations in stable environments, and incremental should be used in unstable environments. For example, Mintzberg (1973) argues that a "planning" (i.e., synoptic) mode of decision making is advisable in a stable environment because the information needed to make comprehensive decisions is potentially available, and because it is relatively easy to integrate decisions into a consistent whole. On the other hand, he advocates an "adaptive" (i.e., incremental) process for firms in unstable environments because such environments are too complex to understand and prevent a high level of integration. Nutt (1976) has presented a similar argument by suggesting that the "closed system" logic of synoptic processes is appropriate only when the environment is predictable, and an incremental process can be employed when the environment places a premium on adaptability.

The authors cited above suggest that in an environment that can be well understood, a firm that employs a comprehensive decision process will make discriminating decisions that can be integrated to ensure cohesive action. In contrast, a noncomprehensive firm is well-equipped for an unstable environment. Its decision speed and flexibility allow fast, low-cost action that can exploit and overcome a changing list of opportunities and threats that defy thorough understanding. Implied in this argument is the assumption that a firm's performance will be affected if the level of comprehensiveness in its strategic decision process is not consistent with the stability of its environment. The resulting hypothesis is as follows:

There will be a negative relationship between the comprehensiveness of strategic decision processes and performance in an unstable environment. A positive relationship would be expected in a stable environment.

Theoretical Model

Because comprehensiveness is an elusive construct, the authors needed a conceptual model that would guide (1) interviews, (2) instrument development, and (3) data analysis and presentation. Therefore, the contributions of several authors (Dewey, 1910; Mintzberg, Raisinghani, & Theoret, 1976; Simon, 1965; Witte, 1972) were drawn on to divide analytic comprehensiveness (number 5 in Table 1), which is concerned with the construct as it appears in the process of making a single strategic decision, into three steps—situation diagnosis, alternative generation, and alternative evaluation. Because integrative comprehensiveness (number 6 in Table 1) is concerned with how comprehensively individual decisions are integrated into any overall strategy that may exist, one final step was added to complete

the model—decision integration. In combination, these four steps provide distinct opportunities whereby organizations can vary the comprehensiveness of their strategic decision process.

Method

Overview

Participating in the research were 109 executives in 27 firms in an industry whose environment is very unstable. Structured interviews were conducted with the CEO of each firm to obtain information about the strategic decision process. Based on these interviews, a decision scenario was written that described an organization attempting to solve a major problem. The scenario provided a detailed description of what the organization did in diagnosing the situation, generating alternatives, evaluating alternatives, and integrating the decision into an overall strategy (i.e., the four steps of the model). The 109 participants then read the scenario and responded to a series of questionnaire items to describe the decision process their firm would use if it faced the same problem. The items were designed to assess the comprehensiveness construct. Responses were aggregated within firms, and relationships between organization performance and comprehensiveness were investigated, controlling for organization size.

Sample

Because of the effort required for interviewing and instrument development, the study was restricted to testing the hypothesized relationship in an unstable environment. This and the nature of the primary data gathering instrument required firms to be from the same industry, which also controlled for the confounding effects of technology and increased the comparability of performance data. In addition, the need for personal contact required all firms to be headquartered in the Pacific Northwest. In light of these constraints, a subset of the forest products industry—Standard Industrial Classification (SIC) 2421, sawmills and planing—was selected as the focal industry. A recent study that used multiple objective measures identified it as the third most unstable of 52 different industries that were randomly selected from a population of over 450 (Dess, 1980). That study employed factor analytic techniques in which the degree of change in industry sales, cost/price margin, and value-added were among the variables that loaded most heavily on the instability dimension.

Potential research sites were identified in a review of *Dun and Bradstreet's Million Dollar Directory* (1979) and *Middle Market Directory* (1979) and contacted if their sole SIC number or one of the first two listed was 2421. Contacted by letter were 43 firms, and 34, 79 percent, were interested in participating. Those not interested included three Canadian firms (all with more than 14,000 employees) and two large (more than 12,000 employees)

and two small (less than 200 employees each) American firms located over 1,000 miles from the investigators. Smaller firms were more prone to participate, as were those near the investigators' institution. The firms that initially expressed interest were headquartered in northern California, Oregon, and Washington and participated in the first phase of a two-phase research method.

Structured Interviews

In the first phase, structured interviews were conducted with the chief executive officer or executive vice president of each firm. The interviewer asked the executive to identify the major problems facing the industry, as well as a major decision recently made in the firm. With regard to the decision, the executive was directed to describe specific actions (e.g., kinds of analyses) that were taken in the four steps of the theoretical model. The interview also was used to gain the firm's commitment to participate in the second, primary data gathering phase and to identify other managers who should participate in that phase.

Each interviewee was presented with a list of major decisions (e.g., add a product line, build a new plant) and asked to identify the managers who normally would be involved in making them. As a result, 123 executives (including the CEOs) who had been in their firms for nearly 20 years each were chosen to participate in the final phase. After the interviews three firms refused to participate further, and four were eliminated because their major business was not SIC 2421. Therefore, 27 firms, 80 percent of those who started, ultimately participated in both phases of the research. Their pertinent characteristics are provided in Table 2.

Scenario and Comprehensiveness Questions

Because comprehensiveness had not been studied before, there were no operational measures of this construct. Therefore, the first step in developing the instrumentation was to identify potential measures in a review of literature in which contributors had distinguished between comprehensive and noncomprehensive decision processes. Among the indicators that were ultimately employed are: (1) assignment of primary responsibility (e.g., having no specific individual responsible for the decision versus forming a special committee of several people); (2) breadth of participation (e.g., areas of expertise and number of participants involved); (3) willingness to go outside the organization for information; (4) primary method used (e.g., one individual's ideas versus extensive analysis); (5) amount of direct, out-of-pocket expenditures made; and (6) range of techniques used, to mention only a few. Most of these indicators are common to each of the four steps of the theoretical model (e.g., number of employees directly involved), and several are unique to a particular step (e.g., breadth of alternatives considered). The indicators then were incorporated into the scenario and accompanying questions.

Table 2
Characteristics of Participating Firms

<i>Firm Number</i>	<i>Approximate Number of Employees^a</i>	<i>Approximate Sales (\$MM)^b</i>	<i>Number of Scenarios Sent</i>	<i>Number of Scenarios Returned</i>
1	< 50	\$ 4	2	1
2	50- 100	\$ 5	2	2
3	50- 100	\$ 9	3	3
4	50- 100	\$ 12	2	2
5	100- 200	\$ 20	4	4
6	100- 200	\$ 15	5	5
7	100- 200	\$ 13	4	4
8	200- 300	\$ 22	6	6
9	300- 400	\$ 50	5	3
10	400- 500	\$ 40	3	2
11	400- 500	\$ 48	4	4
12	400- 500	\$ 54	3	3
13	400- 500	\$ 50	1	1
14	500- 600	\$ 43	4	4
15	800- 1,000	\$ 134	7	3
16	1,200- 1,400	\$ 515	5	5
17	1,200- 1,400	\$ 176	4	3
18	1,800- 2,000	\$ 148	5	5
19	2,000- 2,200	\$ 182	7	6
20	2,300- 2,500	\$ 176	4	4
21	4,300- 4,600	\$ 258	4	4
22	5,000- 7,000	\$1050	5	4
23	7,000-10,000	\$ 675	7	6
24	10,000-13,000	\$ 580	9	9
25	17,000-22,000	\$1300	4	4
26	40,000-50,000	\$5200	6	6
27	40,000-50,000	\$4500	8	6

^aRange provided to preserve anonymity.

^bApproximate figure provided to preserve anonymity.

Information obtained in the interviews was used to develop a five page (single-spaced), written "decision scenario" that depicted a hypothetical forest products firm faced with a major problem—an inability to obtain timber for two years. The scenario described how management had concluded that its "primary manufacturing facilities" were making it uncompetitive, and it indicated how the firm went about deciding if it should build new, state-of-the-art facilities. The body of the scenario was divided into four distinctly headed sections that used indicators mentioned earlier to describe how comprehensive the firm was in: (1) diagnosing the problem, (2) generating alternatives, (3) evaluating alternatives, and (4) integrating the final decision into any overall strategy that might exist. For example, the scenario identified the number of employees directly involved, their areas of expertise, any outsiders that were called on, problem causes and solutions considered, and described any analytic or integrative techniques employed in the four steps. Following the scenario was a series of questions that were designed to assess comprehensiveness as it was characterized in the literature.

Of the 123 executives identified in the interviews (see Table 2), 109, or 89 percent, read the scenario and responded to 43 Likert-type questions to describe how comprehensive their firm would be if it faced the scenario

Table 3
Summary of Comprehensiveness Measures Common and Unique to Four Steps of the Theoretical Model

	Step One <i>Situation Diagnosis</i>	Step Two <i>Alternative Generation</i>	Step Three <i>Alternative Evaluation</i>	Step Four <i>Decision Integration</i>
<i>Single Response Questions</i>				
1. Primary responsibility assigned to	Primary responsibility assigned to	Primary responsibility assigned to	Primary responsibility assigned to	Primary responsibility assigned to
2. Willingness to go outside for information	Willingness to go outside for information	Willingness to go outside for information	Willingness to go outside for information	Willingness to go outside for information
3. Primary method used	Primary method used	Primary method used	Primary method used	Primary method used
4. Number of employees involved	Number of employees involved	Number of employees involved	Number of employees involved	Number of employees involved
5. Amount of direct out-of-pocket expenses	Amount of direct out-of-pocket expenses	Amount of direct out-of-pocket expenses	Amount of direct out-of-pocket expenses	Amount of direct out-of-pocket expenses
6. Number of years of data reviewed ^a	Primary basis for dropping alternatives ^a	Primary basis for dropping alternatives ^a	How many years calculations would be projected ^a	Involvement of affected departments or areas ^a
<i>Multiple Item Composites</i>				
7. Breadth of participants' expertise	Breadth of participants' expertise	Breadth of participants' expertise	Breadth of participants' expertise	Breadth of participants' expertise
8. Breadth of outside information sources used	Breadth of outside information sources used	Breadth of outside information sources used	Breadth of outside information sources used	Breadth of outside information sources used
9. Breadth of problem causes considered ^a	Breadth of solutions considered ^a	Breadth of solutions considered ^a	Breadth of criteria used in evaluation ^a	Breadth of integrative techniques used ^a
10. Breadth of analysis techniques used ^a	Breadth of techniques used to generate alternatives ^a	Breadth of techniques used to generate alternatives ^a	Breadth of reports or summaries prepared ^a	Breadth of decisions integrated with case decision ^a
11. Breadth of factors considered important ^a	Breadth of factors used in eliminating alternatives ^a	Breadth of factors used in eliminating alternatives ^a	Breadth of analysis conducted ^a	

^aQuestion unique to that step.

situation. As Table 3 indicates, seven questions were common to each step, and four each were unique to the situation diagnosis, alternative generation, and alternative evaluation steps of the theoretical model; three appeared only in the decision integration step. Three respondents were eventually eliminated, because of missing data, failure to follow directions, or obvious response bias, before responses by individuals within a firm were aggregated to provide an indication of comprehensiveness for each organization.

To aid the reader, a copy of the questions that pertained to the situation diagnosis section of the scenario (step one of the model) is included as Exhibit 1. Questions regarding the three remaining steps of the theoretical model used the same basic format but substituted several unique questions previously summarized in Table 3. It should be noted that prior to conducting the study, the 43 questions were rated by 5 experts as the best of

Exhibit 1 Questions Used to Assess Comprehensiveness in the First Step of the Theoretical Model

Step One Questions—Questions 1-11 on the next two pages ask you to indicate what **YOUR FIRM** would do to *determine the cause* of the problem if it was unsuccessful in obtaining timber. If you would like to refer back to *Step One: Determining the Cause* in the Northwest Timber case (pages 2-3), please do so.

To answer questions 1-3 below check the *one* choice that *best describes* what would be done in **YOUR FIRM**

1. In your firm *primary* responsibility for determining the problem cause would be assigned to (check only *one*):
 - ☐ a. No specific individual or group
 - ☐ b. One specific individual
 - ☐ c. Two people jointly
 - ☐ d. An existing committee of three or more
 - ☐ e. A specially formed group of three or more
2. In attempting to determine the cause of the problem your firm would (check only *one*):
 - ☐ a. Not be willing to rely on outsiders for any assistance
 - ☐ b. Be willing to rely on one or two outsiders to provide limited assistance
 - ☐ c. Be willing to rely on one or two outsiders for moderate assistance
 - ☐ d. Be willing to rely on outsiders for significant assistance
 - ☐ e. Rely entirely on outsiders if necessary
3. In your firm possible problem causes would be identified *primarily* through (check *one*):
 - ☐ a. The ideas of a single individual
 - ☐ b. Informal discussions among managers
 - ☐ c. Scheduled meetings among managers
 - ☐ d. Scheduled meetings and some analysis
 - ☐ e. Scheduled meetings and extensive analysis

To answer questions 4-6 simply make a *check* on the line to indicate the *number* that is *most appropriate* for **YOUR FIRM**.

4. Approximately how many *employees* would be directly involved in determining the cause of the problem (check only *one*):

2 or less	3-4	5-6	7-8	9-10	11-12	More than 12
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5. Approximately how much in *direct out-of-pocket expenses* (e.g., travel costs, consulting fees) would your firm normally be *willing* to spend to determine the cause of the problem (check only *one*):

Less than \$20,000	\$20,000- \$40,000	\$41,000- \$60,000	\$61,000- \$80,000	\$81,000- \$100,000	\$101,000- \$120,000	More than \$120,000
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6. Approximately how many *years* of historical data (e.g., productivity, cost per board foot) would be reviewed to help determine the cause of the problem (check only *one*):

Less than 1	1	2	3	4	5	More than 5
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Exhibit 1 (continued)

		Very Unlikely	Moderately Unlikely	Somewhat Unlikely	Neither Likely Nor Unlikely	Somewhat Likely	Moderately Likely	Very Likely
Questions 7-11 below also ask you to indicate what YOUR FIRM would do in determining the cause of the timber acquisition problem. PLEASE CIRCLE ONE NUMBER (1 to 7) ON EACH LINE TO INDICATE HOW LIKELY IT IS THAT A PARTICULAR ACTION WOULD BE TAKEN.								
7. How likely is it that <i>employees or outsiders involved</i> in determining the problem cause would have <i>significant expertise</i> in the following:								
a. Logging.....	1	2	3	4	5	6	7	
b. Timber conversion.....	1	2	3	4	5	6	7	
c. Forest management.....	1	2	3	4	5	6	7	
d. Sales or marketing.....	1	2	3	4	5	6	7	
e. Accounting.....	1	2	3	4	5	6	7	
f. Finance.....	1	2	3	4	5	6	7	
g. Formal planning.....	1	2	3	4	5	6	7	
8. How likely is it that any of the following <i>outsiders</i> would be contacted to help determine the cause of the problem:								
a. Individuals from other forest products firms.....	1	2	3	4	5	6	7	
b. Consultants in the forest products industry.....	1	2	3	4	5	6	7	
c. Financial experts.....	1	2	3	4	5	6	7	
d. Equipment manufacturers.....	1	2	3	4	5	6	7	
e. Individuals from firms in other industries.....	1	2	3	4	5	6	7	
f. Consultants from other industries.....	1	2	3	4	5	6	7	
9. How likely is it that your firm would <i>seriously consider</i> each of the following explanations as a cause of the problem:								
a. Continued "panic buying" by competitors.....	1	2	3	4	5	6	7	
b. Inadequate method of calculating bids/purchase offers.....	1	2	3	4	5	6	7	
c. Inaccuracies in individual bid figures.....	1	2	3	4	5	6	7	
d. Uncompetitive operating costs.....	1	2	3	4	5	6	7	
e. Being too conservative in bids/purchase offers.....	1	2	3	4	5	6	7	
10. In your firm's <i>analysis</i> of the problem, how likely is it that each of the following would be included:								
a. Summaries of competitors' purchase/bid success.....	1	2	3	4	5	6	7	
b. Estimates of competitors' conversion costs.....	1	2	3	4	5	6	7	
c. Review of individual figures used to compute unsuccessful bids/purchases.....	1	2	3	4	5	6	7	
d. Summary trends in overrun, employee productivity, and cost per thousand board feet.....	1	2	3	4	5	6	7	
e. Thorough review of existing timber inventory.....	1	2	3	4	5	6	7	
11. How likely is it that each of the following <i>factors</i> would be of <i>major importance</i> in determining the cause of the problem:								
a. Competitors' timber acquisition success.....	1	2	3	4	5	6	7	
b. Your bid/purchase offer accuracy.....	1	2	3	4	5	6	7	
c. Competitors' conversion costs.....	1	2	3	4	5	6	7	
d. Your conversion costs.....	1	2	3	4	5	6	7	
e. Your existing timber inventory.....	1	2	3	4	5	6	7	

nearly 70 potential measures of the comprehensiveness construct. Similarly, in single-response questions, the order of alternative answers that were arranged from least to most comprehensive was verified by the same experts, and they were scaled from 1 to 5 or 7. The authors recognize that other investigators may have chosen different indicators, but the evidence suggests that the construct was adequately assessed by those employed. The entire instrument is available from the first author.

Scenario Issues

It is important to understand why a scenario was used and why it not only depicted the problem, but also described in detail how the problem was solved in one organization. The most obvious benefit of the scenario is that it provides all respondents with a standardized stimulus. This contribution is particularly important because it addresses a major shortcoming of questionnaires—they are subject to respondents' varying interpretations and cognitive orientations, which are a potential source of error. In addition, providing examples of the actions taken in one organization helps respondents understand the phenomenon in question and makes some issues more salient to them. For example, pretests were conducted using a draft of the questions only (without a scenario), and respondents sometimes had difficulty understanding what was being asked (e.g., less sophisticated managers had problems conceptualizing issues concerning the integration of decisions). However, they had no trouble understanding the phenomenon and providing a response once they had read a scenario that illustrated the behaviors in question.

Related to the benefit discussed above, the circumstances depicted in the scenario make it possible to create a strategic *context*, which is critical in determining whether a decision will be perceived as being strategic (Mintzberg, 1979). Therefore, the scenario is potentially valuable in insuring that a respondent's frame of reference is clearly strategic. In addition, because research that relies on participant responses will be successful only if it achieves "involvement" (Fromkin & Streufert, 1976), this approach has another benefit. The scenario as characterized here makes it possible to present respondents with a realistic, detailed situation. Therefore, because the problem, context, described actions, and terminology can be written in such a way that the scenario generates interest and involvement by participants, it is suggested that the scenario increases the likelihood of obtaining an accurate description of their organization's strategic decision process.

It also should be emphasized that the instrument was developed to prevent a variety of biases, and analyses were conducted to detect them. First, a personal letter to each participant pointed out that his firm would receive useful information only if responses were accurate. In addition, immediately following the scenario and before the questions was an instruction sheet that directed respondents to describe what their firm would *usually* do, based on their *experience* in that firm. Therefore, they were not faced with a completely hypothetical situation, but were asked to generalize from their experience to the scenario setting. They also were told that "*there are no correct answers*" and to "indicate how decisions are *actually* made in YOUR FIRM, not how you think they *should* be made." As reported later, it also was possible to check the reliability of responses by determining the level of agreement among individuals in the same organization.

In another attempt to prevent bias, the degree of comprehensiveness attributed to the scenario firm was written at an *intermediate level*. For example, the scenario stated that management considered using "outsiders" (e.g., from other firms, consultants, equipment manufacturers) to help determine the cause of the problem, but decided against it. The subsequent question that tapped this measure allowed respondents to indicate that their firm would be *more or less* comprehensive than the one in the scenario. Other scenario information (e.g., number of employees involved, areas of expertise, analysis conducted) and questions were written similarly. Also, comments attributed to participants in the decision process were included to discourage a normative reaction from respondents. For example, in the decision integration portion of the scenario, an employee suggested that it was "cheaper, faster and more realistic to treat important decisions individually rather than trying to make sure they fit into some written or unwritten plan."

Measures

Measures of organization comprehensiveness, performance, and size were employed to test the hypothesis. In addition, several questions were included to assess the impact of potential confounds.

Comprehensiveness Scores. The comprehensiveness construct was measured by aggregating the responses of individuals in the same firm to produce an organization score on each of the 43 questions. Based on the outcome of several tests that are reported in the results section, three distinct kinds of comprehensiveness scores were used: (1) a firm score on each of the 43 questions (24 single-response and 19 multi-item) presented in the instrument,

$$\text{ORGSCORE}_i = \frac{\sum_j^p X_{ij}}{n} \quad \text{for single-item questions, or}$$

$$\text{ORGSCORE}_i = \frac{\sum_j^p \frac{\sum_k^e x_{ijk}}{e}}{n} \quad \text{for multiple-item (k) questions; } j = \text{respondents}$$

(2) a comprehensiveness score for each of the four steps of the theoretical model,

$$\text{STEPSCORE}_h = \frac{\sum_i^m \text{ORGSCORE}_i}{m} \quad ; m = \text{questions in step}$$

and (3) a single score that represented the comprehensiveness of a firm's overall strategic decision process.

$$\text{OVERALL} = \frac{\sum_h^4 \text{STEPSCORE}_h}{4}$$

Performance. Because organization performance is a complex variable that can be measured many ways (Snow & Hrebiniak, 1980), the measures used in this study address only the firm's most commonly acknowledged goal—economic performance. Two distinct measures of financial performance that reflect the strategic process literature's frequent reference to the importance of balancing "efficiency" and "effectiveness" were selected: (1) average after tax return on assets during the most recent five years and (2) percentage change in gross sales during the same period. Average return on assets was obtained as an indicator of how "efficient" firms were in managing their assets; change in gross sales was included as a measure of "effectiveness" because it provides an indication of long term viability. A 5-year average was used as the first measure to insure that it reflected sustained performance and was not a one-time aberration.

Size. Several authors (Gilmore, 1971; Mintzberg, 1973; Lorange & Vancil, 1976) have suggested that organization size can affect strategic decision processes. Therefore, the impact of this variable had to be assessed in testing the hypothesis. Because most measures of size tend to correlate, only one of the three advocated by Pugh, Hickson, Hinings, and Turner (1969) was used—number of full time employees. In addition to problems of correlated measures, other indicators were not used because most problems of comparability had been overcome by restricting the research to a single industry.

Validity Checks. In an attempt to obtain multiple measures of the comprehensiveness construct and test the assumption that strategic process characteristics are consistent across decisions, four summary "construct validity" questions were included on the last page of the questionnaire. These questions asked respondents to indicate "how comprehensive YOUR FIRM *usually* is in making important decisions." For example, in the first question respondents were told that "a firm that is *very comprehensive* in determining the cause of a major problem might form a group of several members, make extensive use of outsiders, conduct extensive analyses, allow unlimited expenses, involve people with diverse backgrounds, and consider all possible causes. On the other hand, a *very noncomprehensive* firm might rely on the ideas and experience of one or two employees." Respondents were asked "which best describes YOUR FIRM?" and were offered an anchored scale from "very comprehensive" (7) to "very noncomprehensive" (1). Similar questions were offered for each of the three remaining steps of the theoretical model, with the expectation that because the initial phrasing (i.e., how comprehensive your firm *usually* is in making important decisions) implied consistency, its presence could be established by testing the relationship between responses to these questions and the process as characterized in the scenario-based questions.

Another potential problem with the method is that the problem portrayed in the scenario might not be strategic for all firms. If that were the case, a comparative analysis of responses would be misleading. Therefore, a separate question was included on the last page of the questionnaire that asked respondents "how critical a problem would it be if your firm were unsuccessful in obtaining timber for two years?" and offered an anchored scale from "very critical" to "not critical at all." An additional confound could be differences in the amount of management experience in a firm, which would allow some to solve the scenario problem without having to employ a comprehensive process. To assess this possibility, the final question asked respondents to specify the number of years they had been employed in their respective organizations.

Research Results

Aggregation Issues

Aggregating individuals' responses to an organization level would not be appropriate unless there was general agreement within firms. Therefore, an intercorrelation matrix was generated for each firm to determine the correlation between each pair of respondents on the 43 questionnaire items. In four firms, the response of one individual pulled the firm's average below .50, so they were eliminated from the analysis. The authors suggest that such action was appropriate because of the need to insure that each firm's decision process was described as consistently as possible. The average intercorrelation for firms ranged from .51 to .79, with a mean of .63, indicating a high level of agreement among respondents and providing support for aggregating responses to produce an organization score on each of the 43 questions.

Cronbach's alpha was then computed for each of the 19 multi-item composites. The computed alphas ranged from .58 to .83, had a mean of .71, and in combination with the results of the previous paragraph suggested that the analysis could proceed to the organization level using the 24 single-response and 19 multi-item composites (Nunnally, 1967). In addition, Cronbach's alpha was computed for each of the four steps of the theoretical model using the 10 or 11 questions that pertained to the appropriate section of the scenario. This analysis yielded four alphas ranging from .79 to .85, justifying the use of a composite measure of comprehensiveness for each firm on each of the four steps. Finally, an analysis of the four step composites produced an alpha of .96 and suggested that a single overall measure also could be used.

Validity Checks

To determine whether the assumption of consistency across strategic decisions was valid, and because only one scenario decision was used, the

relationship between the step composites and the four previously discussed construct validity questions was assessed. Responses to the construct validity questions exhibited high correlations with the composites for the situation diagnosis ($N=27$, $r=.66$, $p=.000$), alternative generation ($N=27$, $r=.82$, $p=.000$), alternative evaluation ($N=27$, $r=.79$, $p=.000$), and decision integration ($N=27$, $r=.80$, $p=.000$) portions of the questionnaire. Similarly, when an overall measure of comprehensiveness is computed as the mean of the four construct validity questions, it exhibits a strong relationship ($N=27$, $r=.85$, $p=.000$) with the overall measure developed from the scenario-based questions. These results suggest that strategic process characteristics such as comprehensiveness tend to be consistent across decisions and that the profiles developed in response to the scenario were representative of firms' strategic decision processes.

With regard to other potential confounds, results from two questions referred to earlier suggest that they were not a factor. For example, when asked to indicate how critical the scenario situation would be for their firm, respondents' mean response was 6.18 (maximum = 7) and had no significant relationship with any of the comprehensiveness measures for the four steps of the theoretical model, or the overall measure ($N=27$, $r=.17$, $p=.384$). Similarly, accumulated experience was not a factor. The mean tenure in each firm exceeded 18 years and exhibited no significant relationship with any of the step composites, or the overall measure of comprehensiveness ($N=27$, $r=-.09$, $p=.666$). Therefore, the hypothesis can be tested without concern for the most logical confounds.

Hypothesis Testing

To test the hypothesis that "there will be a negative relationship between comprehensiveness and performance in an unstable environment," partial correlations were computed between the 48 measures of comprehensiveness and two measures of organization performance—average after tax return on assets for a five year period, and change in gross sales for the same period. The effect of size was partialled out. As shown in Table 4, the association between average return on assets is strong and consistent, with 15 measures significant at the .05 level or better, and 12 at the .10 level using a one-tailed test. However, the most revealing finding is that all measures exhibit a *negative* relationship with the performance measure that was designed to assess management's "efficiency." This includes the composite measures for each of the four steps and the single overall measure of comprehensiveness ($N=23$, $r=-.42$, $p<.05$).

As Table 5 illustrates, the relationship between comprehensiveness and change in gross sales is similar to that discussed above, though not quite as strong. Correlating with the sales figure at the .05 level or better were 14 measures; 6 were significant at the .10 level when size was held constant. Among the more important revelations from this analysis is that 19 of 20 significantly correlated measures again exhibited a *negative* relationship,

Table 4
Partial Correlations Between Comprehensiveness Measures and Average Return on Assets
(N = 23)

	<i>Situation Diagnosis</i>	<i>Alternative Generation</i>	<i>Alternative Evaluation</i>	<i>Decision Integration</i>
1.	Responsibility assigned to, $-.29^*$	Responsibility assigned to, $-.29^*$	N/S	N/S
2.	N/S	N/S	N/S	N/S
3.	N/S	N/S	Primary method used, $-.29^*$	N/S
4.	N/S	N/S	No. employees involved, $-.32^*$	N/S
5.	N/S	N/S	N/S	N/S
6.	No. years data reviewed, $-.31^{**}$	Breadth of participants' expertise, $-.48^{***}$	Breadth of participants' expertise, $-.57^{***}$	Out-of-pocket expenses, $-.30^*$
7.	Breadth of participants' expertise, $-.33^*$	N/S ^a	N/S ^a	N/S ^a
8.	Breadth of outside information sources, $-.37^{**}$	Breadth of outside information sources, $-.27^*$	N/S	Breadth of participants' expertise, $-.51^{***}$
9.	Breadth of causes considered, $-.35^{**}$	N/S ^a	Breadth of evaluation criteria used, $-.54^{***}$	Breadth of outside information sources, $-.27^*$
10.	Breadth of analysis techniques used, $-.52^{***}$	N/S ^a	Breadth of reports/summaries, $-.51^{***}$	Breadth of integration techniques used, $-.58^{***}$
11.	Breadth of factors considered important, $-.41^{***}$	Breadth of factors in eliminating alternatives, $-.27^{**}$	Breadth of analyses conducted, $-.34^*$	Breadth of decisions integrated, $-.35^{***}$
	Situation diagnosis composite, $-.46^{***}$	Alternative generation composite, $-.31^*$	Alternative evaluation composite, $-.34^*$	Decision integration composite, $-.41^{**}$
		Overall Process Composite, $-.42^{**}$		

N/S: Correlation not significant.

^aIndicates measure unique to that step.

^{*} $p \leq .10$

^{**} $p \leq .05$

^{***} $p \leq .01$

Table 5
Partial Correlations Between Comprehensiveness Measures and Change in Gross Sales
(N = 27)

	<i>Situation Diagnosis</i>	<i>Alternative Generation</i>	<i>Alternative Evaluation</i>	<i>Decision Integration</i>
1. N/S				
2. Willingness to get outside info, -.35**	N/S	Willingness to get outside info, -.36**	N/S	Willingness to get outside info, -.34**
3. Primary method used, -.38**	N/S	Primary method used, -.48***	Primary method used, -.54***	Primary method used, -.49***
4. N/S	N/S	No. employees involved, -.29*	No. employees involved, -.33*	No. employees involved, -.35**
5. Out-of-pocket expenses, .29*	N/S	N/S	N/S	N/S
6. N/S ^a	N/S	Basis for dropping alternatives, -.46***	N/S ^a	Department/area involvement, -.46***
7. N/S	N/S	N/S	N/S	N/S
8. N/S	N/S	N/S	Breadth of outside info sources, -.37**	Breadth of outside info sources, -.33*
9. N/S ^a	N/S ^a	N/S ^a	N/S ^a	N/S ^a
10. N/S ^a	N/S ^a	N/S ^a	N/S ^a	N/S ^a
11. N/S ^a	N/S ^a	N/S ^a	Breadth of analyses conducted, -.37***	N/S ^a
	Situation diagnosis composite, N/S	Alternative generation composite, N/S	Alternative evaluation composite, -.28*	Decision integration composite, -.36**
		Overall Process Composite, -.27*		

N/S: Correlation not significant.

^aIndicates measure unique to that step.

* $p \leq .10$

** $p \leq .05$

*** $p \leq .01$

including the overall measure ($N = 27$, $r = -.27$, $p < .10$). Therefore, the relationships reported between the comprehensiveness of strategic decision processes and return on assets and growth in sales clearly support the hypothesis in an unstable environment. This conclusion is particularly important because the two performance measures exhibited no significant relationship ($N = 23$, $r = -.02$, $p = .467$) with one another.

Discussion

Conclusion

Comprehensiveness is a major characteristic of rational models of strategy formulation, and in this research it exhibited a consistently negative relationship with performance. Therefore, the reported results provide *introductory* evidence that strategic decision processes that are based on rational models are not appropriate for some environments. This conclusion must be qualified subject to several limitations discussed later, but the authors suggest that the findings are not coincidental. The literature (Anderson & Paine, 1975; Mintzberg, 1973; Nutt, 1976) suggests a negative relationship between the construct and performance in an unstable environment, and the researched industry was identified on multiple objective measures as having such an environment (Dess, 1980).

In addition, the evidence suggests that the comprehensiveness construct was adequately measured, particularly for an initial investigation. The reported alphas indicate convergence, there was a high level of interfirm agreement, and there was a strong relationship between the summary construct validity questions and the profiles developed from the scenario-based questions. Moreover, there was variation across firms. Therefore, the instrument exhibited a high level of convergent validity in measuring comprehensiveness and appears to have discouraged the most likely normative response.

Limitations

In spite of the evidence that supports the above conclusion, the study has clear limitations. An example is the issue of causality. It is entirely possible that the performance/comprehensiveness relationship occurs in that order—increased or decreased performance leads a firm to be more or less comprehensive in strategic decision making. Regarding a positive relationship, it has been argued that higher performing firms have the slack resources needed to absorb the cost of comprehensive decision making (Cyert & March, 1963; Litschert & Bonham, 1978). In contrast, it has been speculated (Cyert & March, 1963) that as performance decreases, pressures for change intensify and management tries to do a “better” job. This often means attempting to make decisions more comprehensively.

An equally important limitation of the reported results pertains to their external validity. It is not clear what decision situations and environments are similar to the ones used in this research. Regarding decision situations, the present study employed a single decision scenario because of the response time required (an average of over 45 minutes), and based on the assumption that the characteristics of strategic decision processes (e.g., comprehensiveness), as patterns of organization behavior, tend to be consistent across decisions that are perceived as being clearly strategic. However, an organization's strategy reflects the impact of countless strategic decisions that are made over a period of years; it is the product of *many* decisions. Therefore, even though the previously reported findings suggest that strategic process characteristics are indeed consistent across decisions, evidence based on multiple decisions would be more convincing. Similarly, though strategic decision processes become patterns of behavior, they are subject to change (Perrow, 1961).

With regard to the other external validity issue, the environment, one would expect that industries with equally unstable environments also would exhibit a negative relationship between comprehensiveness and performance. Moreover, because a positive relationship was hypothesized for a stable environment, the first author is conducting an extension of this research with approximately 40 manufacturers of paint and coatings, an industry whose environment is very stable. However, it is important to recognize that any comparison of industries on the relative stability of their environments may be misleading. For example, two industry environments may be similarly stable or unstable on multiple objective measures, but the impact of individual variables may differ greatly by industry. Similarly, a given level of stability may have significantly different consequences in different industries.

In spite of the above limitations, the evidence presented questions the desirability of comprehensiveness in strategic decision making. It remains for future research to assess the generalizability of these findings to other settings and situations.

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Research Notes

ATTRIBUTIONAL INFLUENCES ON THE JOB PERFORMANCE-JOB SATISFACTION RELATIONSHIP

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The relationship between job performance and job satisfaction has been the focus of numerous studies for more than five decades. One of the primary conclusions that can be drawn from this body of research is that job performance-job satisfaction relationships are complex (Jacobs & Soloman, 1977). Accordingly, more recent studies have focused on specific conditions under which these two variables relate (Abdel-Halim, 1980; Fisher, 1980; Inkson, 1978). The general theory of locus of control through causal attributions offers plausible conditions under which performance and satisfaction may or may not be correlated and provides an area of research interest that has not been examined in an organizational setting.

Locus of control is a basic personality dimension characterized by the generalized tendency to attribute cause or control of events to internal (i.e., ability, effort) or external (i.e., luck, task difficulty) causes (Rotter, 1966). To the extent that internality-externality represents a generalized tendency, internals may be expected to attribute job success to internal causes, and externals to external causes. Research by Weiner and his associates (Weiner, 1972; Weiner, Russell, & Lerman, 1978) suggests that job-relevant achievement affect is mediated by performance attributions. Evidence indicates that persons who attribute their performance to internal rather than external causes experience a heightened level of achievement affect (Adler, 1980; Spector, 1982).

Job satisfaction represents one important type of achievement affect. Intuitively, one would expect higher levels of job performance to be associated with higher levels of job satisfaction, but these variables do not consistently correlate (Schwab & Cummings, 1970; Vroom, 1964). Perhaps the level of job performance is not the important factor determining affective reactions. What may be more important in establishing a job performance-job satisfaction relationship are the causes to which successful job performance is attributed. As research has suggested, if performance is attributed to internal causes, resulting job satisfaction (an achievement affect) may be higher than for subjects who attribute job success to external causes (Porac, Nottenburg, & Eggert, 1981). By assigning internal causes to job performance, the individual takes personal credit for job success

and personal responsibility for future job performance. Such attributions may foster a more positive affective reaction to the job as the individual experiences a greater sense of control over job outcomes.

The purpose of this study is to examine the moderating influences of locus of control on the performance-satisfaction relationship. Locus of control is expected to moderate this relationship because of the generalized tendency of internals to attribute job success to internal causes. *It is hypothesized that the relationship between performance and satisfaction will be stronger for those persons who tend to attribute cause or control to internal factors as opposed to external factors.*

Method

Subjects. The sample was comprised of 116 respondents (106 were male) at a medium sized industrial company employing almost 1,300 workers. The study was conducted with only the technical employees in the engineering department of the organization. The department employed 253 technical personnel. A total of 130 questionnaires were returned and, of these, 116 provided usable data (46 percent response rate). The mean age of the sample was 34, and the average length of service was 6 years. Length of service ranged from less than 1 year to more than 23 years. Of the respondents, 91 percent reported a college background.

Measures. Job satisfaction: The scale used to measure satisfaction was the Job Description Index (JDI) (Smith, Kendall, & Hulin, 1969), which provides five subscales of job satisfaction: work, supervision, pay, promotion, and co-workers. The pay and promotion scales were doubled (per Smith et al.) to provide fairly equal point and range scores. The subscales then were summed to obtain an overall measure of job satisfaction. Kuder-Richardson internal consistency coefficient for the total scale was .92, with subscale coefficients ranging from .82 to .92.

Job performance: Independent supervisory rankings were used to evaluate individual performance. In all, 52 immediate supervisors provided performance rankings for each of the 253 employees in the engineering department. Supervisors were asked to rank their group members on the basis of overall performance, with the best performer given a "1," the next best a "2," and so on. Performance ranks received by the 116 subjects in the study were used as the performance measure.

Locus of control: Rotter's (1966) locus of control instrument was used to determine the internal/external control tendencies of each subject. The scale is well-documented with respect to both validity and reliability (Robinson & Shaver, 1976). Kuder-Richardson internal consistency coefficient of the scale for this study was .83.

Results

Pearson product-moment correlations between the study variables together with means and standard deviations reported separately for internals,

Table 1
Descriptive Statistics and Intercorrelations Among Study Variables

Study Variables	Internals (N = 59)		Externals (N = 66)		All Subjects								
	M	SD	M	SD	M	SD	1	2	3	4	5	6	7
1. Overall satisfaction	180.1	42.4	178.3	37.4	179.2	30.3	—	—	—	—	—	—	—
2. Pay satisfaction	30.2	11.6	33.0	12.7	31.7	6.1	.53**	—	—	—	—	—	—
3. Promotion satisfaction	27.7	19.3	23.9	14.9	25.7	8.6	.60**	.33**	—	—	—	—	—
4. Work satisfaction	36.7	8.0	36.0	10.4	36.4	9.4	.36*	.17*	.18*	—	—	—	—
5. Supervision satisfaction	42.3	9.9	42.7	9.3	42.5	9.6	.77**	.29**	.32**	.47**	—	—	—
6. Coworker satisfaction	42.9	9.9	42.8	10.7	42.8	10.3	.76**	.22**	.29**	.48**	.47**	—	—
7. Job performance	3.1	2.3	3.5	2.3	3.3	2.3	-.07	-.13	-.16*	-.02	.05	.03	—
8. Locus of control	26.5	1.7	33.9	3.5	30.5	4.6	-.11	.07	-.12	-.11	-.09	.07	.13

* $p \leq .05$ ** $p \leq .01$

externals, and all subjects combined are presented in Table 1. Internals are subjects with locus of control scores at or below the median (median = 29.80). Each satisfaction subscale was significantly related to every other subscale and to the summation measures of overall satisfaction.

Locus of control is not related to performance or to any of the satisfaction measures. With the exception of the correlation between performance and satisfaction with promotion, the nonsignificant relationships among the satisfaction measures (dependent variables), performance (independent variable), and locus of control (moderating variable) permit a more reliable interpretation of the relative importance of the partial regression coefficients in moderated regression analysis and lessens the concern for artifactual results attributable to problems of multicollinearity (Kerlinger & Pedhazur, 1973).

Results of the moderated regression analysis are presented in Table 2. Zedeck (1971) recommends that examinations of potential moderator variables include an assessment of their contribution as independent predictor variables in the course of regression analysis. Locus of control was examined first as an independent predictor of job satisfaction. Results indicated that locus of control did not significantly predict any of the job satisfaction measures. (*F* values for locus of control as an independent predictor were: Overall satisfaction, *F* = .42; satisfaction with work, *F* = 1.03; satisfaction with supervision, *F* = .68; satisfaction with pay, *F* = .57; satisfaction with promotion, *F* = .45; satisfaction with co-workers, *F* = .37; *df* = 1,111; *p* > .05.)

Table 2
**Results of Moderated Regressions for Satisfaction Measures,
Job Performance, and Locus of Control^a**

<i>Satisfaction Measure (Dependent Variable)</i>	<i>Regression Variables^b</i>	<i>R</i>	<i>R</i> ²	ΔR^2	<i>F</i>
Job satisfaction—overall	P, LC	.122	.015		
Job satisfaction—overall	P, LC, P × LC	.298	.088	.074	9.02*
Satisfaction with pay	P, LC	.138	.019		
Satisfaction with pay	P, LC, P × LC	.291	.085	.066	7.97*
Satisfaction with promotion	P, LC	.176	.031		
Satisfaction with promotion	P, LC, P × LC	.348	.121	.090	11.41*
Satisfaction with work	P, LC	.100	.010		
Satisfaction with work	P, LC, P × LC	.108	.012	.002	.17
Satisfaction with supervision	P, LC	.083	.007		
Satisfaction with supervision	P, LC, P × LC	.159	.025	.018	2.09
Satisfaction with co-workers	P, LC	.059	.004		
Satisfaction with co-workers	P, LC, P × LC	.100	.010	.007	.75

^a*df* = 1,111.

^bP = job performance, LC = locus of control.

**p* ≤ .01

For the moderated regression analysis, the hierarchical inclusion method was used for decomposition of the explained sum of squares into components attributable to each independent variable and the interaction term.

Performance was entered into the regression analysis first, followed by locus of control, and then the interaction term (job performance \times locus of control). The F test for the partial regression coefficient associated with the interaction term indicates the significance of the incremental contribution of this term to the explained variance in the dependent variable after the effects of all other independent variables have been removed.

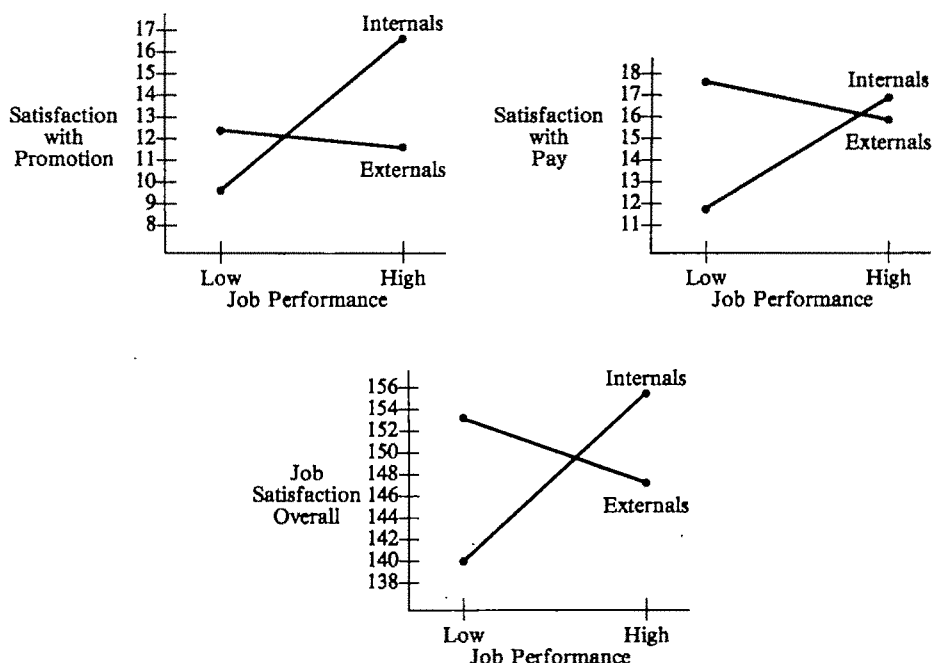
The interaction of job performance and locus of control added significantly to the explained variances in overall satisfaction, satisfaction with pay, and satisfaction with promotion apart from the variance explained by performance and locus of control. Incremental variances in satisfaction with work, satisfaction with supervision, and satisfaction with co-workers because of the interaction term were not significant. The results indicate that locus of control operates as a significant moderator of the performance-satisfaction relationship.

Locke, Mento, and Katcher (1978) have shown that differential validity can result from variations among subgroups in degree of homogeneity with respect to a predictor or criterion variable. They found that ability predicted performance better within groups that were homogeneous in terms of motivation than within groups that were heterogeneous in this respect. To examine this explanation of moderating effects in the present study, Cochran's C statistic was used to test for homogeneity of variance in both satisfaction and performance for internals and externals (Winer, 1971). The results indicated that no significant differences existed in variance of satisfaction or performance scores between internal and external groups. (Overall satisfaction $C = .5927$; satisfaction with pay, $C = .5436$; satisfaction with promotion, $C = .6074$; $p > .05$.) Differences in homogeneity of satisfaction and performance scores within internal and external subgroups do not appear to be a plausible explanation for the moderating effects of locus of control.

To assess further the moderating effects of locus of control, significant interactions were analyzed graphically in Figure 1. Internals and externals were determined by a median split on locus of control. Within each subgroup, multiple regression equations were computed as indicated above with locus of control and the interaction term removed. Following Hunt, Osborn, and Larson (1975), values of job performance \pm one standard deviation from the overall mean performance score were substituted into each subgroup regression equation and the results plotted for visual assessment of the significant interactions.

For overall satisfaction, satisfaction with pay, and satisfaction with promotion, the performance-locus of control interaction is disordinal (i.e., the regression lines cross) over the relevant ranges of performance scores. In general, the relationship between job performance and these three satisfaction measures is positive and significant for internals. For externals, these same relationships are slightly negative and nonsignificant. The pattern of these three interactions is remarkably similar.

Figure 1
Significant Interaction Effects of Locus of Control
on Job Satisfaction Overall, Satisfaction with Pay,
and Satisfaction with Promotion



Discussion

The results of this study indicate that a significantly stronger relationship occurred between performance and satisfaction for individuals with internal orientations. Although levels of job performance (and job satisfaction) were relatively constant between internals and externals, the relationship between performance and satisfaction was significantly different for persons with greater internal orientations. The results tend to support the hypothesis that persons who attribute outcomes to internal causes tend to experience heightened affective reactions (Weiner, 1972).

In addition to overall satisfaction, locus of control moderated the relationship between performance and satisfaction with pay and satisfaction with promotion. This may be because pay and promotion often represent direct rewards for successful job performance, unlike satisfaction with work, supervision, and co-workers. Internals, who tend to take personal credit for job success, are more likely to be alert to those aspects of their environments, such as pay or promotion, that provide useful information about future behavior (Rotter, 1966). As Spector (1982) suggests, if rewards follow performance, internals are likely to be more satisfied. Results from this study tend to support this conclusion.



Interpretations of the results of this study are subject to certain limitations. Though locus of control represents a general tendency to make internal attributions, it does not comprise a direct measure of job success attribution. The assumption that internals in the study internalized cause or control of job success, though plausible, is not tested in this study. Further research testing moderating influences of locus of control should examine directly the causes to which job success is attributed.

In addition to theoretical aspects of these findings, certain practical implications are suggested. Careful attention to individual differences is in order when providing feedback on job performance. For internals, feedback based on changing subordinates' behavior through individual motivation processes and training programs may be most appropriate. For externals, the leader might direct his responses to changing the task or situation—for example, providing better information, changing organizational policies, providing more help and resources. For the external, the focus of the leader possibly should emphasize more control of the environment rather than direct, internal motivation of the individual.

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AGE STEREOTYPES AS A FUNCTION OF RACE

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Much attention has been given in the past to issues regarding the stereotyping of women and minorities. More recently, attention has been turned to a related issue—that of age stereotypes. O'Connell and Rotter (1979) found that males up to age 75 were perceived as more effective and autonomous than females. They also reported that female respondents evaluate males and females with increasing age similarly, but males evaluate males with increasing age more positively.

Other research has been reported on age stereotyping as it relates to the work environment and management practices. These studies specifically evaluated attitudes toward the older worker and various personnel decisions affected by them. Rosen and Jerdee (1976a) have demonstrated that stereotypical attitudes are held with regard to the older worker in the areas of performance capacity, potential for development, and stability, but not for interpersonal skills. A second study by Rosen and Jerdee (1976b) further indicated that age prejudices do influence behavior. They found that age discrimination occurred in a variety of business decisions made by subjects simulating management decision making using an in-basket technique. A third study, by Rosen, Jerdee, and Lunn (1981), attempted to see if age discrimination occurred relative to retirement decisions when employee performance was considered. This study showed that when work performance was equal, older persons received less favorable treatment with regard to retirement decisions. High performers were judged to be fit to continue their employment, regardless of age. In a fourth study, Rosen and Jerdee (1979) again reported significant age effects in simulated management decisions concerning employee retirement, this time controlling for job status, which produced no significant effects.

In contrast to the O'Connell and Rotter study, the Rosen and Jerdee findings (1976a, 1976b) indicate mixed rater gender effects with respect to attitudes toward age. The future female manager (as represented by current business students used as subjects in the studies) is just as likely to hold stereotyped attitudes based on age as is her male counterpart in the areas of performance capacity and potential for development, but not for stability and interpersonal skills. Females were found equally likely to discriminate against the older worker in simulated management decisions.

It is noted that none of these studies considered the effects of rater race on age stereotyped attitudes, although they all considered rater sex and age effects. As minority participation in the management profession increases, it is important to learn whether research findings based in many cases on entirely white samples generalize to blacks. Research such as that cited above needs to be expanded to include data on race. Will the black manager follow the pattern of the emerging female manager, whose attitudes toward the aged in turn appear to mimic her male colleague? Will the attitudes of blacks towards the older worker also be a negative influence in managerial decision making with regard to the older worker? Will the emerging black management professional continue or break this pattern? To find answers to this question the first study conducted by Rosen and Jerdee was replicated. This time a sample of black and white as well as male and female students was used. Other than this change, the study was identical to the original one. The objective of the study was to determine if rater race affects attitudes toward the older worker on the four work-related dimensions—performance capacity, potential for development, stability, and interpersonal skills.

Method

The 65 items classified into the four work-related dimensions reported by Rosen and Jerdee (1976a) were arranged in bipolar form. A 10-point scale, anchored at zero with the response "not at all accurate" and at 9 with the response "very accurate," was utilized as was done in the original study. The subjects rated both a 30-year-old man and a 60-year-old man on each of the 65 items, as was done in the original study.

Subjects and Procedure

Completing the questionnaire were 125 respondents, including 51 undergraduate business students attending predominantly-white North Carolina State University and 74 black undergraduate business students attending predominantly-black North Carolina Central University. There were 58 females and 67 males in the sample. The mean age was 21.1, and the standard deviation was 2.2.

Participants were informed (as they were in the original study) that the purpose of the questionnaire was to obtain information on how people

perceive adult males in different age categories. The subjects were told that there were no correct or incorrect answers, and they were encouraged to give their own honest and frank opinions.

The academic major of all 51 white undergraduate business students was accounting. Of the 74 black undergraduate business students, 39 listed their major as accounting. The other 35 had chosen more general areas of concentration, such as marketing, management, or finance. No significant differences were found on any of the four work-related dimensions between accounting and nonaccounting majors within the black student group. Therefore, the two groups of black students were combined for the purpose of further analysis.

Results

Mean ratings of the 30-year-old man and the 60-year-old man are given in Table 1 for black and white students. A visual inspection of these means shows that the black students always rated the 60-year-old worker lower on all dimensions than did the white students. The black students also rated the 30-year-old man higher than did the white respondents in three of the four dimensions, with stability being the only exception. Thus, the race differences may be due to the black students' giving higher ratings to young men *and* lower ratings to older men. Or, stated another way, the race differences may be due to white students' giving lower ratings to younger men *and* higher ratings to older men.

Table 1
Mean Ratings of 30-Year-Old Man and 60-Year-Old Man^a

Scale	White Students				<i>t</i>	Black Students				<i>t</i>
	30-Year-Old	60-Year-Old				30-Year-Old	60-Year-Old			
Performance capacity	6.80	(6.30)	5.03	(4.94)	13.80**	7.02	4.60			17.17**
Potential for development	6.54	(6.29)	4.40	(4.56)	18.30**	6.64	4.08			18.31**
Stability	5.24	(5.05)	6.27	(5.79)	-9.09**	5.12	5.88			-5.85**
Interpersonal skills	4.80	(4.94)	5.40	(5.02)	-4.53**	5.00	5.10			-97

^aResults of Rosen and Jerdee (1976a) study are shown in parentheses.

* $p < .05$

** $p < .01$

Table 2 shows differences in average ratings by age for black and white respondents in three of the four categories. Differences between black student ratings of younger and older men are significantly greater than differences in white student ratings for the dimensions of performance capacity and potential for development; the difference between white student ratings of interpersonal skills of younger and older men is significantly greater than the difference between black student ratings. The magnitude of age related

Table 2
Mean Difference of Ratings for 30-Year-Old Man and 60-Year-Old Man for Black and White Students

<i>Scale</i>	<i>Black D</i>	<i>White D</i>	<i>t</i>
Performance capacity	2.42	1.77	3.42**
Potential for development	2.56	2.14	2.27*
Stability	-.76	-1.03	1.52
Interpersonal skills	-.10	-.60	2.69**

* $p < .05$

** $p < .01$

differences varies among dimensions similarly for white and black students; age differences are greatest for potential for development, followed by performance capacity, stability, and interpersonal skills.

Discussion

The results of this study, a replication of Rosen and Jerdee's (1976a) findings on age stereotypes, can serve to illustrate again that care must be exercised in making judgments about workers on the basis of age. A new finding indicates that black students also hold age stereotypes and these stereotypes are somewhat more extreme than those held by white students.

One potential explanation of the difference between the black and white stereotypes may be a scholastic achievement factor. The mission of the traditionally black university mandates service to students less well prepared, and in the present study the comparisons across race may be biased by prior academic education. Another possible explanation could be differences in how work itself (and, hence, the typical worker visualized in the questionnaire) is viewed. For example, if the black respondents visualized a worker performing physically demanding work and the white respondents visualized a worker performing, say, clerical work, the differences may reflect differences in expected job requirements rather than age biases. Vinson and Holloway (1977) indicate that blacks and whites do view their work environments differently.

There is little in the literature that can help provide insight into these differences. One study, conducted by Schmitt and Lappin (1980), found that both blacks and whites favored their own racial groups when making performance evaluations of subjects shelving books, a situation in which actual performance was controlled. The black biases were more pronounced than the white biases.

The results of this study partially confirm the generalizability of age stereotypes from whites to blacks, and they also demonstrate differences between whites and blacks. It is important to consider whether or not findings of other research with white samples can be generalized to black samples. As blacks move into managerial positions, it is important to know the extent

to which they share stereotypes and stereotypical behavior with white managers.

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The Comprehensiveness of Strategic Decision Processes: Extension, Observations, Future Directions¹

JAMES W. FREDRICKSON
Columbia University

A recent study in an industry with an unstable environment (Fredrickson & Mitchell, 1984) reported a negative relationship between comprehensiveness (a measure of rationality) and organization performance. An extension of that study establishes a positive relationship between comprehensiveness and performance in a stable environment.

The value of using a "comprehensive" process to make and integrate strategic decisions has been debated for years. Fredrickson and Mitchell (1984) recently argued that comprehensiveness is a measure of rationality. They defined it as the extent to which organizations attempt to be exhaustive or inclusive in making and integrating strategic decisions. In addition, they hypothesized a negative relationship between the construct and performance for an industry with an unstable environment, and used written stimulus materials to establish that relationship in a sample of forest products firms. They also predicted a positive relationship in a stable environment.

This paper reports the results of a study that extended the previous work by testing for the hypothesized positive relationship between comprehensiveness and performance in an industry with a stable environment. It used the same method and measures as the initial study. The conclusions of the combined studies are discussed also, and observations are provided regarding the theory, method, and construct.

Capsulizing the Theory

Organization Strategy

An organization's strategy determines the extent of match or alignment between its external environment and its internal structure and processes

¹The author gratefully acknowledges financial support from the Graduate Schools of Business of the University of Pittsburgh and Columbia University in conducting this research. Donald C. Hambrick provided valuable comments on an earlier version of this manuscript.

(Galbraith & Nathanson, 1978; Jemison, 1981; Miles & Snow, 1978). A majority of contributors on the topic of strategy formulation have argued that this match is best achieved by using a formal planning process, which has resulted in organization strategy usually being thought of as a consciously integrated "plan" (Andrews, 1971; Chandler, 1962). However, other contributors have suggested that a firm's strategy is more likely the result of many strategic decisions that have been made, one at a time, over a period of years (Mintzberg, 1978; Quinn, 1980; Uytterhoeven, Ackerman, & Rosenblum, 1977). Based on this perspective, Fredrickson and Mitchell (1984) emphasized that strategy formulation is a *decision making* process, and they suggested that investigators should study how organizations make individual (i.e., single) strategic decisions and whether they attempt to integrate those decisions into some overall strategy.

In the decision-based perspective suggested above, the strategic process is an organization-level phenomenon. It is characterized as a pattern of behavior that develops in an organization (Weick, 1979) and that is apparent to its executive-level personnel. Therefore, it is similar to what Barnard (1938) previously described as an organization's "technique of decision." Most importantly, evidence from the initial study supports the view that as a pattern of behavior, the characteristics of a firm's strategic process tend to be consistent across decisions that are perceived as being clearly strategic. This consistency makes it possible to study the most critical strategic process issues, such as comprehensiveness, without having to consider an endless number of decisions at any point in time.

Comprehensiveness: A Critical Issue

Two types of models are the most common in the strategy formulation literature. The dominant "synoptic" type is based on a rational model of decision making; the "incremental" alternative purports to provide a more accurate description of how organizations actually make strategic decisions. A comparison of these two approaches (Fredrickson & Mitchell, 1984) suggested that they differ on at least six major characteristics: (1) what initiates the process, (2) the role of goals, (3) the relationship between means and ends, (4) the concept of choice, (5) how comprehensive organizations are in making individual strategic decisions, and (6) how comprehensive they are in integrating those decisions into an overall strategy. Each of these differences provides an opportunity to answer important questions, but the "comprehensiveness" characteristics appear to be the most important.

The most fundamental feature of synoptic strategy formulation models is the emphasis placed on being "comprehensive" in making individual strategic decisions (i.e., analytic comprehensiveness) and integrating those decisions into an overall strategy (i.e., integrative comprehensiveness). For example, proponents of synoptic models (Andrews, 1971; Grant & King, 1982; Hofer & Schendel, 1978; Thompson & Strickland, 1981) argue that strategic decision making should be exhaustive or inclusive in a variety of

decision activities (e.g., establishing goals, scanning the environment, assessing internal capabilities). Therefore, in the earlier study this construct was defined as follows—*the extent to which an organization attempts to be exhaustive or inclusive in making and integrating strategic decisions.*

In contrast to the above argument, authors in several fields have questioned the reality and advisability of using a comprehensive process. For example, individuals' cognitive limitations have been cited as an explanation of why organizations establish "bounds of rationality" (March & Simon, 1958) that result in "satisficing" choices (Cyert & March, 1963). Similarly, it has been argued that suggestions to be comprehensive ignore the costs of obtaining the necessary information and delay an organization's response time (Braybrooke & Lindblom, 1970). In addition to obstacles to being comprehensive in making individual strategic decisions (i.e., achieving analytic comprehensiveness), there also are problems to overcome in trying to integrate those decisions into a consistent whole (i.e., achieving integrative comprehensiveness). Quinn (1980) has summarized this issue by suggesting that it is impossible for a manager to orchestrate external events, internal decisions, needed information, and so on effectively so that they all come together at a desired moment. However, still other contributors have argued that the appropriateness of comprehensive decision processes depends on the setting.

Hypotheses

Uncertainty is the difference between the information needed to perform a task and the information available (Galbraith, 1973). Therefore, Thompson (1967) has argued that because organizations are expected to act rationally, the environment is a major source of uncertainty and is a threat to rationality. With regard to organization decision making, several authors (Aldrich, 1979; Nutt, 1976; Thompson, 1967) suggest that the environment becomes a problem if critical decision variables are not apparent or, more importantly, when it is difficult to develop an understanding of cause and effect relationships among those variables. Therefore, though environments have been characterized on a variety of dimensions, the degree of stability is the one most often identified as affecting organization decision making (Duncan, 1972).

A stable environment increases the likelihood that critical decision variables can be identified and allows theory to be developed regarding the relationships among those variables and the organization. In contrast, an unstable environment makes it difficult to achieve the high level of certainty sought by rational models. This argument has been noted by contributors to the strategy formulation literature (Anderson & Paine, 1975; Mintzberg, 1973; Nutt, 1976), who suggest that synoptic processes, which are based on a rational model, are appropriate for organizations in stable environments but incremental processes should be used in unstable environments. Because comprehensiveness is a major feature of synoptic models, these authors similarly would suggest that comprehensive processes are appropriate for

stable environments but not for unstable. Implied in this view is the assumption that a comprehensive decision process will result in superior performance in an environment that can be well understood. A noncomprehensive process, with its speed and flexibility, will have a similar effect in an unstable environment. The resulting hypothesis is as follows:

There will be a negative relationship between the comprehensiveness of strategic decision processes and performance in an unstable environment. A positive relationship would be expected in a stable environment.

Theoretical Model

To aid in studying the comprehensiveness of strategic decision processes, a four-step model was again employed. Analytic comprehensiveness, which is concerned with the construct as it appears in the process of making a single strategic decision, was divided into three steps: situation diagnosis, alternative generation, and alternative evaluation. One final step—decision integration—was added to accommodate integrative comprehensiveness, which is concerned with how comprehensively individual decisions are integrated into any overall strategy that might exist. Therefore, organizations can vary the comprehensiveness of their strategic decision processes in each of the four steps.

Research Method

Overview

The same method and measures employed earlier by Fredrickson and Mitchell (1984) were used with 152 executives from 38 firms in an industry with a stable environment. Structured interviews were conducted with the CEO of each firm and provided the basis for a written decision scenario that described an organization that was attempting to solve a major problem. The scenario provided a detailed description of what the organization did in diagnosing the situation, generating alternatives, evaluating alternatives, and integrating the decision into an overall strategy (i.e., the four steps of the model). Participants read the scenario and responded to a series of questionnaire items to describe the decision process their firm would use if it faced the same problem. Questions were designed to assess the comprehensiveness construct. Responses then were aggregated within firms, and relationships with the organization's performance were investigated, controlling for organization size.

Sample

The purpose of this study was to extend the earlier work by testing for a positive relationship between comprehensiveness and performance in an

industry with a stable environment. Therefore, Standard Industrial Classification 2851—paint and coatings—was selected as the focal industry. The paint and coatings industry is well known for its lack of sales growth and modest technological change, and Dess (1980) recently identified it as the most stable of 52 randomly selected industries. In that study factor analytic techniques were used, and change in industry sales, cost/price margin, and value-added loaded most heavily on the stability dimension.

A review of Dun and Bradstreet's (1981) *Million Dollar Directory* identified numerous firms whose sole or first classification was 2851. Because of the need for personal interviews, 51 firms in the eastern and central United States were contacted; 45, 88 percent, expressed an interest in participating. Those not interested included three larger firms (more than 500 employees), two of which had recently been reorganized, and an equal number of small firms. Because the average organization in this industry is quite small (65 percent have less than 20 employees), the larger ones appear to have been less likely to participate. The firms that participated in the first phase of the two-phase study were headquartered in Illinois, Indiana, Maryland, Ohio, Pennsylvania, northern Kentucky, and western New York.

Structured Interviews

Structured interviews were conducted with the chief executive officer or executive vice president of each firm to identify the major problems facing the industry and to discuss a major decision recently made in the firm. Regarding the decision, the interviewee was asked to describe specific actions (e.g., kinds of analyses) that took place in the four steps of the theoretical model. He also was presented with a list of important decisions (e.g., add a product line, build a new plant) and asked to identify the managers who normally would be involved in making them. However, three firms would not participate beyond the interviews, and four were eliminated because their dominant business was not 2851. As illustrated in Table 1, 164 executives in 38 firms were ultimately identified to participate in the second and final phase of the study.

Scenario and Comprehensiveness Questions

Information obtained in the interviews was used to develop a 5-page (single-spaced) "decision scenario" that depicted a hypothetical paint and coatings manufacturer faced with a major problem—a 16 percent decline in sales in 11 months. The scenario described how management concluded that its increasing manufacturing costs, at a time when competitors had automated, were making its products overpriced and were a primary contributor to the loss of sales. Therefore, as with the earlier study, the scenario indicated how management went about deciding if it should build new, state-of-the-art facilities. Similarly, the body of the scenario was again divided into four distinctly headed sections that contained indicators of the construct

Table 1
Characteristics of Participating Firms

<i>Firm Number</i>	<i>Number of Employees</i>	<i>Approximate Sales (\$MM)^b</i>	<i>Number of Scenarios Sent</i>	<i>Number of Scenarios Returned</i>
1	20	2	3	3
2	23	3	4	4
3	26	3	3	2
4	32	5	3	3
5	34	3	4	4
6	35	4	7	7
7	36	4	5	4
8	40	3	3	3
9	40	5	4	3
10	44	4	2	2
11	50	2	3	3
12	52	3	5	4
13	60	5	4	4
14	65	6	4	4
15	75	11	3	3
16	75	11	4	4
17	90	11	3	3
18	100	10	3	3
19	100	7	5	5
20	110	8	3	3
21	120	18	6	6
22	122	14	4	4
23	145	11	3	3
24	170	14	4	4
25	200	33	3	3
26	225	19	3	3
27	230	14	4	4
28	310	31	5	5
29	500-700 ^a	50	7	7
30	800-1000 ^a	80	4	4
31	900-1200 ^a	110	5	5
32	1100-1400 ^a	120	3	2
33	1200-1500 ^a	120	5	4
34	1500-1800 ^a	150	5	5
35	4000-5000 ^a	270	6	4
36	7000-9000 ^a	550	7	7
37	7000-9000 ^a	900	7	5
38	15000-20000 ^a	1500	8	6

^aRange provided to preserve anonymity.

^bApproximate figure provided to preserve anonymity.

to describe how comprehensive the firm was in (1) diagnosing the problem, (2) generating alternatives, (3) evaluating alternatives, and (4) integrating the final decision into any overall strategy that might exist. Following the scenario were a series of questions that were designed to assess comprehensiveness.

The CEOs were among 152 executives, 93 percent of those identified, who read the scenario and responded to 43 Likert-type questions to describe how comprehensive their firm would be if it faced the scenario situation. Five responses were eventually eliminated because of missing data, failure to follow directions, or obvious response bias. As indicated in Table 2, seven questions were again common to each step of the theoretical model, and four each were unique to the situation diagnosis, alternative generation,

Table 2
Summary of Comprehensiveness Measures Common and Unique to Four Steps of the Theoretical Model

<i>Step One</i> <i>Situation Diagnosis</i>	<i>Step Two</i> <i>Alternative Generation</i>	<i>Step Three</i> <i>Alternative Evaluation</i>	<i>Step Four</i> <i>Decision Integration</i>
<i>Single Response Questions</i>			
1. Primary responsibility assigned to information	Primary responsibility assigned to information	Primary responsibility assigned to information	Primary responsibility assigned to information
2. Willingness to go outside for information	Willingness to go outside for information	Willingness to go outside for information	Willingness to go outside for information
3. Primary method used	Primary method used	Primary method used	Primary method used
4. Number of employees involved	Number of employees involved	Number of employees involved	Number of employees involved
5. Amount of direct out-of-pocket expenses	Amount of direct out-of-pocket expenses	Amount of direct out-of-pocket expenses	Amount of direct out-of-pocket expenses
6. Number of years of data reviewed ^a	Primary basis for dropping alternatives ^a	How many years calculations would be projected ^a	Involvement of affected departments or areas ^a
<i>Multiple Item Composites</i>			
7. Breadth of participants' expertise	Breadth of participants' expertise	Breadth of participants' expertise	Breadth of participants' expertise
8. Breadth of outside information sources used	Breadth of outside information sources used	Breadth of outside information sources used	Breadth of outside information sources used
9. Breadth of problem causes considered ^a	Breadth of solutions considered ^a	Breadth of criteria used in evaluation ^a	Breadth of integrative techniques used ^a
10. Breadth of analysis techniques used ^a	Breadth of techniques used to generate alternatives ^a	Breadth of reports or summaries prepared ^a	Breadth of decisions integrated with case decision ^a
11. Breadth of factors considered important ^a	Breadth of factors used in eliminating alternatives ^a	Breadth of analyses conducted ^a	

^aIndicates question unique to that step.

and alternative evaluation steps. Three appeared only in the decision integration step. Responses by individuals in the same organization then were aggregated to produce several measures of comprehensiveness for each firm.

It should be emphasized that the questions employed in this study were the same as those used in the initial one. However, some of the alternatives offered in multi-item composites (e.g., types of problem causes considered) were modified to reflect the realities of the paint and coatings industry, and jargon employed in the scenario was also peculiar to that industry. More importantly, the array of alternatives offered for several questions was rescaled to reflect industry differences.

For example, the paint and coatings industry is significantly less profitable and capital intensive than forest products. Therefore, the response continuum for the question that asked how much in "direct out-of-pocket expenses" their firm would consider making in determining the cause of the problem, generating alternatives, and so on ranged from "less than \$10,000" (1) to "more than \$60,000" (7), instead of from "less than \$20,000" (1) to "more than \$120,000" (7), as in the initial study. Similarly, although these organizations were quite small, it was the author's perception that their executives exhibited greater management sophistication than their counterparts in the forest products industry. (This probably is due to the industry's basis in chemicals, which dictates more formal education.) They placed a higher priority on discharging their management responsibilities and had a larger proportion of employees devoted to performing management tasks. Therefore, the continuum of alternatives in several other questions (e.g., primary method used) was modified to increase the likelihood that there would be variance across firms. However, for the purposes of data analysis, all responses were again scaled from 1 to 5 or 7.

It should also be emphasized that the same precautions employed in the initial study were again used to insure that the instrument's bias potential was minimized and assessed. More specifically, both the instructions provided to respondents and the comments included in the scenario and attributed to participants in the decision process were written to discourage a normative response. In addition, the amount of comprehensiveness attributed to the scenario firm was written at an intermediate level, which allowed respondents to indicate that their firm would be more or less comprehensive than the scenario firm if it faced the same decision. (The complete instrument used in each study is available from the author.)

Measures

The measures of organization comprehensiveness, performance, and size used by Fredrickson and Mitchell (1984) were employed to test the hypothesis. Similarly, several questions were included to assess the impact of potential confounds.

Comprehensiveness Scores. As mentioned in the previous section, the comprehensiveness construct was measured by aggregating responses within

a firm on each of the 43 questions. Based on the outcome of several tests that are reported in the results section, three kinds of comprehensiveness scores were used: (1) a firm score on each of the 43 questions (24 single-response and 19 multi-item); (2) a comprehensiveness score for each of the four steps of the theoretical model; and (3) a single score that represented the overall comprehensiveness of a firm's strategic decision process. The manner in which these 48 scores were computed is reported in Fredrickson and Mitchell (1984).

Performance. Two measures of economic performance were again employed: (1) average after-tax return on assets during the most recent five years, and (2) percentage change in gross sales during the same period. Average return on assets was used to assess how "efficient" firms were in managing their resources; change in gross sales was included as a measure of long term viability or "effectiveness."

Size. Because a firm's size can affect its strategic decision process (Lorange & Vancil, 1976; Mintzberg, 1973), this variable was assessed in testing the hypothesis. The number of full time employees was used because most size measures tend to correlate and because most comparability problems were overcome by restricting the study to a single industry.

Validity Checks. To obtain multiple measures of the comprehensiveness construct and to allow a test of the assumption that strategic process characteristics are consistent across decisions, four summary "construct validity" questions were again included on the last page of the questionnaire. They asked respondents to indicate "how comprehensive YOUR FIRM usually is in making important decisions." For example, in the first question respondents were told that "a firm that is *very comprehensive* in determining the cause of a major problem might form a group of several members, make extensive use of outsiders, conduct extensive analyses, allow unlimited expenses, involve people with diverse backgrounds, and consider all possible causes. On the other hand, a *very noncomprehensive* firm might rely on the ideas and experience of one or two employees." Respondents were asked "Which best describes YOUR FIRM?" and were offered an anchored scale from "very comprehensive" (7) to "very noncomprehensive" (1). Similar questions were offered for each of the three remaining steps of the theoretical model.

To determine whether the situation portrayed in the scenario was strategic for all firms, a separate question was included on the final page of the questionnaire. It asked respondents "How important a decision would it be if your firm were considering building a new plant?" and offered an anchored scale from "very important" (7) to "not important at all" (1). An additional confounding element could be differences in the amount of management experience in a firm, which could allow some firms to solve the scenario problem without having to use a comprehensive process. Therefore, the last question asked respondents to specify how many years they had been employed in their respective firms.

Research Results

Aggregation Issues

To assess the level of agreement within a firm, an intercorrelation matrix was generated for each firm to determine the correlation between each pair of respondents on the 43 questionnaire items. In four instances one individual's response pulled a firm's average below .50, so those individuals were eliminated from the analysis. Following this adjustment, the average firm intercorrelation ranged from .50 to .86 and had a mean of .61, suggesting that responses could be aggregated to produce an organization score on each of the 43 questions.

To assess the convergent validity of the 19 multi-item composites, Cronbach's alpha was computed for each. The computed alphas ranged from .56 to .95 and had a mean of .74, suggesting that an organization-level analysis using the 19 multi-item composites and the 24 single-response questions would be appropriate (Nunnally, 1967). In addition, alphas computed for each of the four steps of the theoretical model ranged from .70 to .82, which justified the use of a composite measure of comprehensiveness for each firm on each of the four steps. Similarly, the four-step composites produced an alpha of .94, suggesting that a single overall measure also could be used.

Validity Checks

To test the assumption that the characteristics of strategic processes (in this case comprehensiveness) are consistent across decisions, and because only one decision scenario was used, the relationship between the step composites and the four construct validity questions was assessed. Responses to the construct validity questions exhibited strong correlations with the composites for the situation diagnosis ($N=38$, $r=.77$, $p=.000$); alternative generation ($N=38$, $r=.77$, $p=.000$); alternative evaluation ($N=38$, $r=.78$, $p=.000$); and decision integration ($N=38$, $r=.74$, $p=.000$) portions of the questionnaire. Also, when a single measure of comprehensiveness was computed as the mean of the four construct validity questions, it exhibited a strong relationship ($N=38$, $r=.87$, $p=.000$) with the overall measure developed from the scenario-based questions. These results suggest that strategic process characteristics such as comprehensiveness tend to be consistent across decisions and that the profiles developed in response to the scenario were representative of the firms' strategic decision processes.

When asked to indicate how important the scenario situation would be for their firm, participants' mean response was 6.6 (maximum = 7) and had no significant relationship with the comprehensiveness of the four steps of the theoretical model, or the overall measure ($N=38$, $r=.05$, $p=.387$). Accumulated experience, another logically confounding element, also can be ruled out because mean tenure in each firm was nearly 18 years and

exhibited no significant relationship with any of the step composites, or the overall measure of comprehensiveness ($N=38$, $r=-.01$, $p=.479$).

Hypothesis Testing

To test for a positive relationship between comprehensiveness and performance in a stable environment, partial correlations (controlling for size) were computed between the 48 measures of comprehensiveness and the two measures of organization performance. As indicated in Table 3, associations with average return on assets are strong. Of the measures, 32 are significant at the .05 level or better using a one-tailed test, 28 of which are *positive*. More importantly, each of the composites for the situation diagnosis ($N=37$, $r=.45$, $p<.01$), alternative generation ($N=37$, $r=.43$, $p<.01$), alternative evaluation ($N=37$, $r=.43$, $p<.01$), and decision integration ($N=37$, $r=.45$, $p<.01$) steps exhibits a strong positive relationship with this measure of efficiency, as does the overall comprehensiveness measure ($N=37$, $r=.49$, $p<.01$).

In contrast to the above results, no relationship between comprehensiveness and change in gross sales was established. Only 2 of 48 measures were significant at the .05 level or better, with another five at the .10. Moreover, none of the four step composites, or the overall measure of comprehensiveness ($N=38$, $r=.07$, $p=.35$), exhibited a significant relationship with the measure that was designed to assess long term effectiveness.

Discussion

Primary Conclusions

The above results suggest that strategic decision processes that are based on a rational model are appropriate for firms in industries with a stable environment. Comprehensiveness is a primary characteristic of such models, and in this study it exhibited a strong *positive* relationship with average after-tax return on assets. Although a similar relationship was not established with the sales growth measure, the author suggests that such an outcome does not negate the above conclusion. Return on assets is the more important of the two performance measures, particularly for firms in a stable environment. In such a setting an efficient firm can still remain viable by realizing a good return even though sales growth is modest. (In fact, a lack of sales growth is one of the variables that Dess, 1980, used to characterize a stable environment.) However, the reverse is not true—it is unlikely that a firm can survive over the long term if returns on assets are poor, even though sales growth is substantial.

Comprehensiveness exhibited a consistently *negative* relationship with performance in the initial study (Fredrickson & Mitchell, 1984). This included the relationship between the overall measure and average after-tax return on assets ($N=23$, $r=-.42$, $p<.05$), as well as change in gross sales

Table 3
Partial Correlations Between Comprehensiveness Measures and Average Return on Assets
(N = 37)

<i>Situation Diagnosis</i>	<i>Alternative Generation</i>	<i>Alternative Evaluation</i>	<i>Decision Integration</i>
1. Responsibility assigned to, .53** 2. N/S	Responsibility assigned to, .37** N/S	Responsibility assigned to, .34* N/S	Responsibility assigned to, .34* N/S
3. Primary method used, .33*	Primary method used, .51**	Primary method used, .35**	Primary method used, .50**
4. No. employees involved, .48**	No. employees involved, .55**	No. employees involved, .56**	No. employees involved, .50**
5. Out-of-pocket expenses, .44**	Out-of-pocket expenses, .49**	Out-of-pocket expenses, .46**	Out-of-pocket expenses, .44**
6. N/S*	Basis for dropping initial alternatives, .46** N/S	No. years calculations projected, .33** N/S	Involvement of affected departments, .50** N/S
7. Breadth of participants' expertise, .30*			
8. Breadth of outside information sources, -.39**	Breadth of outside information sources, -.48**	Breadth of outside information sources, -.43**	Breadth of outside information sources, -.32*
9. N/S*	Breadth of solutions considered, .29** N/S*	Breadth of evaluation criteria used, .28** N/S*	N/S*
10. N/S*		Breadth of analyses conducted, .33**	N/S*
11. N/S*		Alternative evaluation composite, .43**	Decision integration composite, .45**
Situation diagnosis composite, .45**	Alternative generation composite, .43**	Overall Process Composite, .49**	

N/S indicates correlation not significant.

*Indicates measure unique to that step.

** $p \leq .05$

*** $p \leq .01$

($N = 27$, $r = -.27$, $p < .10$). Therefore, in combination the two studies provide empirical support for the view of authors (Anderson & Paine, 1975; Mintzberg, 1973; Nutt, 1976) who have argued that there is no "best" way to make and integrate strategic decisions. Rather, synoptic processes, which are based on a rational model, are appropriate for organizations in stable environments; incremental should be used in unstable environments. Although comprehensiveness is just one measure of rationality, the combined experience with the construct suggests that it is the most encompassing one and allows a direct test of the theory.

Consistent with the theory espoused by the above contributors, firms that were successful in the unstable environment (i.e., forest products) made decisions quickly and without trying to integrate them into some overall strategy. This action allowed them to exploit and counter a continually changing list of opportunities and threats and did not commit their resources to an uncertain course. In contrast, firms that performed well in the stable environment had an overall strategy that the decision fit into. Such an environment offers relatively few opportunities and those that do arise are apparent to most competitors. Therefore, because they have a smaller margin for error and less frequent opportunities, executives whose firms operate in a stable environment must make discriminating decisions or suffer with the results of poor decisions for years. The practical implications of these observations are clear. They also highlight the complex problem that must be faced by firms that compete in multiple industries, some of which have stable environments, others unstable. In addition to evidence regarding the synoptic/incremental debate, the combined studies also produced observations on the theory, method, and construct, each of which has implications for future research.

Theory Observations

It was suggested in the initial paper that a decision-based view of strategy, which focused on how organizations make and integrate individual strategic decisions, offered several advantages. More specifically, it was supposed to have both practical and methodological benefits—providing the investigator with a much larger population of potential research sites, allowing the individual process characteristics to be directly investigated and accommodating a variety of methodologies. Experience in the two studies indicates that the realized benefits of this perspective were significant. For example, because all firms make strategic decisions, even though they may not have formal planning systems, this perspective made it possible to include the entire population as prospective participants and to accept firms of significantly different size. This benefit was particularly important in the paint and coatings study, in which the firms are small but exhibit variance in their strategic decision processes.

A decision-based perspective also had practical benefits that allowed the comprehensiveness construct to be studied. It was argued earlier that the

strategic process is a pattern of organization behavior (Barnard, 1938; Weick, 1979) that is visible to executive-level members, and that "the characteristics of that process tend to be consistent across decisions that are perceived as clearly strategic" (Fredrickson & Mitchell, 1984, p. 400). This consistency assumption made it possible to study the characteristics of strategic processes without engaging in reductionism—studying an endless number of decisions at any point in time. Evidence obtained from the construct validity questions employed in both studies clearly supports the consistency assumption. Therefore, the studies suggest that the characteristics of firms' strategic processes do indeed exhibit patterns, and they encourage investigators to think in terms of recurring phenomena. Similarly, the decision-based perspective facilitated the development of the research method, which has its own implications for future investigation.

Method Observations

A decision-based perspective has been employed by previous strategic process investigators (Bower, 1970; Carter, 1971; Mintzberg, 1978; Mintzberg, Raisinghani & Theoret, 1976; Pettigrew, 1973; Quinn, 1980) who used in-depth field approaches to gather qualitative data. However, because their approaches did not allow statistical verification or subsequent testing, their contributions were primarily in model and theory development. In contrast, experience from the combined studies indicates that a combination of structured interviews and written decision scenarios was able to obtain quantifiable measures of a major strategic process characteristic, achieve construct validity, and obtain variance across organizations. The author suggests that much of this success can be attributed to the described research method.

The scenario is the most distinctive feature of the method used in these studies, but it is important to emphasize that the structured interviews played a critical role. Face-to-face contact with industry executives had the practical benefit of gaining increased firm commitment, but it was particularly important in the development of the scenarios and questions. More specifically, the interviews provided the author with an understanding of the industry (problems, economics, jargon, etc.) that was critical to preparing an instrument that would stimulate respondents' participation. Therefore, the interviews and instrumentation are interdependent, and in combination they give the method several benefits.

The most obvious benefit of the decision scenario is in providing all respondents with a standardized stimulus. This contribution is particularly important because a major shortcoming of questionnaires is that they are subject to respondents' varying interpretations and cognitive orientations, both of which are a potential source of error. However, experience in the two studies suggests that a scenario administered with the questions helps respondents to understand the phenomenon in question and makes some variables more salient to them. For example, as mentioned in the initial

paper, pretests were conducted using a draft of the questions only, and respondents sometimes had difficulty interpreting what was being asked (e.g., less sophisticated managers had problems conceptualizing issues relating to the integration of decisions). However, they had no trouble understanding the phenomenon and providing a response once they read a scenario that illustrated the behaviors they needed to understand. Therefore, the scenario appears to be helpful by creating in respondents a more restricted, common field of vision, which, though desirable, is not likely to occur when questions are presented independently.

An additional and related benefit of the method has to do with the circumstances depicted in the scenario. Using a scenario makes it possible to create a strategic *context*, which is critical in determining whether a decision will be perceived as being strategic. As Mintzberg has pointed out, "no type of decision is inherently strategic; decisions are strategic only in context. The introduction of a new product is a major event in a brewery, but hardly worth mentioning in a toy company" (1979, p. 60). Therefore, the scenario is valuable not only in insuring that respondents' frames of reference are consistent, but that their level is clearly strategic.

As a final benefit, using a scenario makes it possible to present respondents with a realistic, detailed situation. The context, problem, described actions, and terminology can all be written in such a way that the scenario generates interest and, therefore, "involvement" by respondents. As discussed by Fromkin and Streufert (1976), research that relies on participant response will be successful only if it achieves participant involvement. Therefore, it is suggested that by increasing respondents' involvement in their task, the scenario helps them to provide a more accurate description of their organization's decision process. Results from both studies—good levels of interfirm agreement, nearly 90 percent response rate in each, and the willingness of executive-level participants to commit an average of 45 minutes to read a scenario and respond to the questions—support this observation. Therefore, the method appears to have been critical in two studies of the comprehensiveness construct, which has several implications of its own.

Construct Observations

Comprehensiveness was presented as a measure of rationality and defined as the extent to which organizations attempt to be exhaustive or inclusive in making and integrating strategic decisions. However, experience gained in the two studies has helped provide a richer and more precise view of exactly what comprehensiveness means to an organization. For example, it is important to emphasize that participation in the strategic process is not limited to a few individuals who are located at the very top of the organization. Although final choice may be the prerogative of a single individual, numerous authors (Carter, 1971; Chandler, 1962; Quinn, 1980) have recognized that individuals at a variety of locations and levels throughout the organization participate in information gathering and processing

activities. Therefore, it is the patterned behavior of these individuals that makes one organization's strategic process highly comprehensive, while another's is very noncomprehensive. Although it was argued earlier that the successful firms in the unstable forest products industry "made decisions quickly, and without trying to integrate them," it must be recognized that individuals, not organizations, make and integrate strategic decisions. Therefore, to understand the comprehensiveness construct as an organization-level phenomenon, one must understand what it means for individuals' decision making behavior, and how that behavior becomes patterned.

The author has reached several conclusions on the above issue based on insight gained in the studies' nearly 80 interviews. For example, the most distinguishing feature of behavior in an organization with a comprehensive strategic decision process is the emphasis on, and the characterization of, decision making. In such organizations the process of decision making (or contributing to various decision making activities) is considered a major part of each manager's job, and it is viewed as a largely analytical activity. Participants are sensitive to the impact that different outcomes can have on the organization, and they appear to be motivated to find an intendedly rational solution to which they are committed. Therefore, their search for information tends to be far-reaching and unbiased by experience and functional orientation, and they try to achieve a degree of precision that allows choices to be made at the margin. Similarly, those who contribute to the strategic process in a firm that is comprehensive exhibit a variety of behaviors that aid integration. For example, they conceptualize a decision in terms of its broad impact, incorporate it into financial projections, and purposely involve other departments and divisions to ensure that a decision's overall effect has not been underestimated.

In contrast, participants who contribute to the strategic process in a noncomprehensive firm see decision making as a highly judgmental activity that rests primarily in the hands of a dominant manager. As such, analysis is replaced by informal discussion, and search behavior is heavily biased by experience and orientation. Moreover, individual decisions tend to be viewed in isolation and are regarded as distinct incidents. For example, a decision about a new manufacturing facility is likely to be seen as the responsibility of the production personnel, and suggestions to involve participants from other areas would be considered inappropriate. Therefore, any integration is likely to take place only in the mind of the dominant manager, if at all.

The author suggests that a firm's existing structure offers the best explanation of why comprehensive or noncomprehensive patterns develop in an organization's strategic decision process. It has long been recognized (Bower, 1970) that a firm's structure can affect its strategic process, and that recognition has become increasingly common (Bobbitt & Ford, 1980; Bourgeois & Astley, 1979; Burgelman, 1983; Fahey, 1981). Moreover, the argument for a causal link between organization structure and the strategic decision process should not be surprising. As Bower has noted, "when

management chooses a particular organization form, it is providing not only a framework for current operations but also channels along which strategic information will flow" (1970, p. 287). Similarly, because March and Simon (1958) suggest that the primary purpose of organization structure is to provide "bounds of rationality" that overcome individuals' cognitive limitations, it likely will affect the extent to which a strategic process is exhaustive or inclusive (i.e., comprehensive).

Future Research

There are several ways that future research can overcome the limitations of the combined studies, or simply build on their findings. For example, the issue of causality raised in the initial paper (i.e., do varying levels of comprehensiveness cause varying levels of performance, or does performance variation cause variation in comprehensiveness?) is still unresolved, and longitudinal studies are the obvious solution. In addition, though introductory evidence suggested that the characteristics of strategic decision processes tend to be consistent across decisions, that issue was not the primary one in the reported studies. Therefore, the research was not designed with the consistency question as a priority, and future studies should test it more directly by presenting respondents with multiple decisions.

A major question also must be resolved before the method can be used on a large scale. The reported studies were restricted to one industry with an unstable environment (i.e., forest products) and one with a stable environment (i.e., paint and coatings), and two industry-specific instruments were prepared. Because of this approach, there is a legitimate question as to whether the method can be used to study simultaneously the strategic decision processes of firms in different industries. Such an application probably would require the content of the scenario and the alternative responses in multi-item questions (e.g., areas of expertise represented) to be considerably more general than they were in the reported studies. The problem described, the terminology used, and so on also could not be peculiar to a particular industry. Because there appears to be a trade-off between the benefits of gaining multiple industry participation and the risk of decreased involvement by participants, additional studies are needed to determine the method's potential breadth of application.

Another area for future research relates to the comprehensiveness construct. Although the comprehensiveness construct may be the most distinctive and predictive feature of an organization's strategic decision making process, the results achieved in this extension emphasize the need for additional work. For example, the only measure to exhibit a significant *negative* relationship with average return on assets in the paint and coatings study was the item that assessed the "breadth of outside information sources" used in each of the four steps of the theoretical model. The impact of this measure was overwhelmed by the strength of the others, but its sign raises questions and suggests that the construct needs to be refined further.

impact of this measure was overwhelmed by the strength of the others, but its sign raises questions and suggests that the construct needs to be refined further.

Table 4, which summarizes the relationships between the comprehensiveness and performance measures in the two studies, further indicates that some measures were consistently better predictors than others. For example, among measures that were common to each of the four steps, the multi-item composite that assessed the "breadth of outside information sources" exhibited 11 significant relationships of a possible 16 (8 in each study). Similarly, the single response measure of the "number of employees involved" in each of the four steps was significantly related in nine instances,

Table 4
Significance Levels of the 43 Comprehensiveness Measures
Presented in the Questionnaire Items of the Two Studies

<i>Situation Diagnosis</i>					
		<i>Return on Assets</i>		<i>Change in Sales</i>	
		<i>Study 1</i>	<i>Study 2</i>	<i>Study 1</i>	<i>Study 2</i>
<i>Common to all steps:</i>					
Responsibility assigned to.....	(8) ^a	*	***		*
Willingness to get outside information	(4)			**	
Primary method used	(8)		**	**	
Number of employees involved	(9)		***		*
Direct out-of-pocket expenses	(6)		***	*	
Breadth of participants expertise	(5)	*	**		
Breadth of outside information sources.....	(11)	**	**		
<i>Unique to a step:</i>					
Years of data reviewed	(1) ^b	*			
Breadth of					
causes (#9)	(1)		**		
analysis (#10)	(1)		***		
factors (#11)	(1)		**		
<i>Alternative Generation</i>					
		<i>Return on Assets</i>		<i>Change in Sales</i>	
		<i>Study 1</i>	<i>Study 2</i>	<i>Study 1</i>	<i>Study 2</i>
<i>Common to all steps:</i>					
Responsibility assigned to.....	(8)	*	***		
Willingness to get outside information	(4)			**	
Primary method used	(8)		***		
Number of employees involved	(9)		***	*	
Direct out-of-pocket expenses	(6)		***		
Breadth of participants expertise	(5)	***			
Breadth of outside information sources.....	(11)	*	***		*
<i>Unique to a step:</i>					
Bases for dropping alternatives	(2) ^b		***	***	
Breadth of					
solutions (#9)	(2)		**		***
alternatives (#10)	(2)				
analysis (#11)	(2)	*	*		

^aNumber of significant relations of 16 potential relationships.

^bNumber of significant relations of 4 potential relationships.

* $p < .10$

** $p < .05$

*** $p < .01$

Table 4 (continued)

		<i>Alternative Evaluation</i>			
		<i>Return on Assets</i>		<i>Change in Sales</i>	
		<i>Study 1</i>	<i>Study 2</i>	<i>Study 1</i>	<i>Study 2</i>
<i>Common to all steps:</i>					
Responsibility assigned to.....	(8) ^a		**		*
Willingness to get outside information.....	(4)			**	
Primary method used.....	(8)	*	***	***	
Number of employees involved.....	(9)	*	***	*	
Direct out-of-pocket expenses.....	(6)		***		
Breadth of participants expertise.....	(5)	***			
Breadth of outside information sources.....	(11)		***	**	**
<i>Unique to a step:</i>					
Years of projections.....	(1) ^b		**		
<i>Breadth of</i>					
criteria (#9).....	(2)	***	**		
reports (#10).....	(1)	***			
analysis (#11).....	(4)	*	**	**	*
		<i>Decision Integration</i>			
		<i>Return on Assets</i>		<i>Change in Sales</i>	
		<i>Study 1</i>	<i>Study 2</i>	<i>Study 1</i>	<i>Study 2</i>
<i>Common to all steps:</i>					
Responsibility assigned to.....	(8)		**		
Willingness to get outside information.....	(4)			**	
Primary method used.....	(8)		***	***	
Number of employees involved.....	(9)		***	**	
Direct out-of-pocket expenses.....	(6)	*	***		
Breadth of participants expertise.....	(5)	***			
Breadth of outside information sources.....	(11)	*	***	**	
<i>Unique to a step:</i>					
Involvement of departments.....	(2) ^b		***	***	
<i>Breadth of</i>					
techniques (#9).....	(1)	***			
decisions (#10).....	(1)	**			

^aNumber of significant relations of 16 potential relationships.

^bNumber of significant relations of 4 potential relationships.

* $p < .10$

** $p < .05$

*** $p < .01$

and the questions that assessed "responsibility assigned to" and the "primary method used" each exhibited eight. In contrast, the single response question that assessed "willingness to get outside information" was significantly related only four times.

Regarding measures that were unique to one of the four steps of the theoretical model, the multi-item composite that assessed the "breadth of analysis conducted" in the alternative evaluation step was significant in all four possible relationships (two in each study). Numerous other measures were significantly associated twice. At the other extreme, the "breadth of techniques [used] to generate alternatives" exhibited no significant relationships in four opportunities. Such items should be dropped from future studies or rewritten to overcome inherent problems, and new items should be added to improve the construct's predictive power. Similarly, other data sources (e.g., objective measures of expenditures paid to consultants) should

be added in an attempt to increase construct validity because data in the two studies represent only one source—managers' perceptions.

A final area for future research concerns other strategic process questions that can be addressed by building on the experience reported here. For example, the comparison of synoptic and incremental strategy formulation models (Fredrickson & Mitchell, 1984) identified four additional strategic process characteristics for which questions remain unanswered (e.g., what initiates the process, the role played by goals, the relationship between means and ends, the concept of choice). Similarly, it would be valuable to determine whether specific characteristics (goals, means/ends, comprehensiveness, etc.) have varying impact on performance. The previous discussion regarding the relationship between comprehensiveness and organization structure also raises questions that warrant testing. The author suggests that these questions and many others can be addressed more readily if investigators employ the theoretical perspective and research method that were used in the reported studies.

Concluding Remarks

The lack of empirical testing in strategy formulation research has been attributed to poorly trained investigators (Hatten, 1979), the intangible nature of strategic process constructs (Mintzberg, 1977), and the practical difficulties of doing strategic-level research (Rumelt, 1979). However, experience in two studies suggests that progress has been delayed by two more basic and interrelated problems: (1) investigators have conceptualized strategy formulation in a way that is not operational for research purposes, and (2) they have not emphasized construct and method development. However, by adopting a decision-based perspective that focused on how organizations make and integrate individual strategic decisions, structured interviews and written decision scenarios were combined to obtain reasonably valid measures of the comprehensiveness construct. Moreover, significant yet opposite relationships were established between the construct and organization performance in industries with stable and unstable environments.

The author suggests that the two studies combine to answer a critical question in the debate regarding synoptic and incremental processes. Their primary results support the contention that neither approach is clearly better than the other, but that synoptic processes are appropriate for firms in stable environments and incremental processes are appropriate in unstable environments (Anderson & Paine, 1975; Mintzberg, 1973; Nutt, 1976). In addition, experience in the two studies illustrates the benefits of employing alternative perspectives and methodologies. Therefore, it is hoped that the primary conclusions will prove valuable and interesting and that other investigators will be able to use the theoretical perspective, method, or construct in future research on strategic decision processes.

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Porter's (1980) Generic Strategies as Determinants of Strategic Group Membership and Organizational Performance¹

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A multimethod, multivariate analysis of "intended" strategies provides empirical support for the presence of strategic groups based upon Porter's (1980) generic strategies. Variations in intraindustry profitability and growth are found to be related to strategic group membership. Firms identified with at least one generic strategy outperformed firms identified as "stuck in the middle."

The primary purpose of this paper is to demonstrate the viability and usefulness of categorizing firms within an industry into strategic groups on the basis of their intended strategies. These intended strategies may be identified on the basis of Porter's (1980) generic strategies—differentiation, overall low cost, and focus. This study consists of three distinct but interrelated phases. Phase 1, the field study, examines the relationship between a firm's "intended or espoused" (Mintzberg, 1978) strategy—represented by the competitive methods (e.g., competitive pricing) considered most important by the firm's top management team—and the presence of strategic orientations within an industry. These strategic orientations are classified on the basis of which of the three alternative generic strategies they appear to represent most closely. Phase 2 consists of a panel of experts who assess the importance of each of the identified competitive methods for each generic strategy. The use of this panel serves to corroborate the researchers' inferences drawn from the field study. Phase 3 uses the perceptions of the chief executive officers to cluster firms that exhibit a

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similar strategic orientation into distinct groups. Measures of performance for firms comprising each strategic group are assessed to detect whether significant differences exist between strategic groups within an industry. Differences in performance have important implications for both practicing managers and academicians interested in the strategic group concept.

Theoretical Background and Empirical Research

The field of strategic management has shown a noticeable shift away from the atomistic view of strategy—in which each firm is considered unique in all aspects—toward a new view that supports the recognition of commonalities that exist among firms. These configurations have been referred to as “gestalts” (Hambrick, 1983b; Miller, 1981), said to represent “tightly integrated and mutually supportive parts, the significance of which can best be understood by making reference to the whole” (Miller, 1981, p. 3). Similarly, Hatten (1979), in his discussion of strategic groups within an industry, recognized that subgroups of firms employ different mixes of what are substantially the same strategic variables. Thus, strategic groups provide a useful intermediate frame of reference between viewing the industry as a whole and considering each firm separately (Porter, 1980). The emerging concept of a strategic group of firms provides a framework for answering recent calls for empirical “evidence that strategies differ among firms and that better strategies make a difference in performance results” (Schendel & Hofer, 1979, p. 517).

The presence of groups of firms within an industry following similar strategies has been identified in the home appliance (Hunt, 1972), the chemical process (Newman, 1973), the consumer goods (Porter, 1973), and the brewing industry (Patton, 1976). Quantitative models of the brewing industry (Hatten & Schendel, 1977; Patton, 1976) recognized that firms within an industry differ along dimensions other than size and market share.

Unfortunately, most of the multivariate measurement of strategy used to develop the strategic groups concept has relied almost exclusively on measures of implemented strategy. One problem with existing typologies has been that few of the propositions regarding the types of strategies a firm may follow to become a leader in its market have been tested with data different from that used to develop them (Schendel & Hofer, 1979). This methodological limitation may lead to findings that lack generalizability and that are incapable of confirmation in other research settings. Another problem is that existing typologies tend to put business unit strategies into generic categories based on the size or market share of the firm and its rate of return on investment (Hatten, 1974; Porter, 1979). Such a narrow approach limits the applicability of many typologies to a rather select group of firms within an industry and presents little in the way of prescriptions useful across size categories within an industry. It is believed that Porter's framework of generic strategies and competitive dimensions provides a

potentially valuable research tool for classifying the strategies of all competitors within an industry.

Many previous models of strategic groups (Hambrick, 1983a; Porter, 1974) have implied that organizational strategies could best be inferred by analyzing patterns in organizational resource allocations. However, the reliance upon measures of resource allocations may inhibit recognition of the central thread or underlying logic of a firm's strategy by failing to consider the role of strategic choice as exercised by key organizational members. The notion of strategic choice recognizes that similar organizations operating within the same environment may choose to address that environment differently based on the strategic orientation of their management (Ackoff, 1970). Indeed, the element of strategic choice is inherent within the concept of strategy, which is viewed as implying that "the organization pursues a purposive, directive course, whether it is described in terms of a pattern of decisions, or in terms of the *goals, plans, or intentions* of the organization" (White & Hamermesh, 1981, p. 216, emphasis added). Previous evidence for the importance of strategic choice for market behavior, although compelling, has relied on indirect measures to show that firms follow different strategies within an industry (Caves, 1980).

Hambrick (1980) recognized that it should be possible to develop multivariate measures of intended strategies as well as implemented strategies. Demonstration of the ability of a multivariate measure of strategic choice to classify firms into homogeneous groups based on Porter's model of generic strategies would provide much needed empirical evidence, not only for the construct validity of Porter's (1980) typology but also for the notion of strategic groups in general.

Porter develops three potentially successful generic strategies for creating a defensible position and outperforming competitors in a given industry. The first, overall cost leadership, although not neglecting quality, service, and other areas, emphasizes low cost relative to competitors. The second strategy, differentiation, requires that the firm create something, either a product or a service, that is recognized industrywide as being unique, thus permitting the firm to command higher than average prices. The third is a focus strategy, in which the firm concentrates on a particular group of customers, geographic markets, or product line segments. These three generic strategies represent three broad types of strategic groups, and thus the choice of strategy "can be viewed as the choice of which strategic group to compete in" (Porter, 1980, p. 149). Firms oriented toward specific strategies should outperform firms characterized by Porter as "stuck in the middle." Porter maintains that this latter class of firms, by failing to develop its strategy along at least one of these three categories, is "almost guaranteed low profitability" (1980, p. 41).

The underlying proposition of this paper is that variations in intraindustry profitability and growth may be explained on the basis of strategic group membership. The strategic groups model also serves to explain differences in performance among firms of equivalent sizes: even when firms are divided

by size class within an industry, each division may contain members of more than one strategic group.

Method

Overview

The field study was comprised of responses from executives of a sample of firms that were used to develop the dimensions associated with the three generic strategies offered by Porter. For the second phase, a panel of experts from the academic community provided recommendations regarding the appropriate content of each of Porter's generic strategies. The use of a panel of experts in strategy research follows the recommendations of Harrigan (1983) for the refinement and corroboration of investigator inferences developed from field research. Thus, the first two phases of the study enabled the researchers to combine the *descriptive* capability of field research with the *normative* recommendations obtained from a panel of experts.

Phase 3 of the study classified firms with similar strategic orientations into distinct groups. These groups were developed from the responses of the subsample of firms in which the chief executive officer was the primary respondent. Measures of performance for firms comprising each strategic group were assessed to detect the presence of significant differences among the strategic groups.

Phase 1: Field Study

Strategic orientations within an industry were seen by the researchers as represented by the views of top management teams about the competitive methods firms use in their industry. When the research instrument was constructed it was assumed that all members of the top management team had knowledge of the strategy of their firm, and that the strategy could be inferred on the basis of the emphasis or importance given various competitive methods available to the firm.

Porter recognizes that the strategies that companies use to compete in an industry can differ in a wide variety of ways, and he proposes a number of "strategic dimensions" that should capture the possible differences among the strategic options of companies in a given industry. These dimensions are comprised of competitive methods that include brand identification, channel selection, technological leadership, cost position, service, and leverage, among others (Porter, 1980). These competitive methods provide a means for characterizing the strategies of competitors within an industry. A group of firms within an industry that follows the same or a similar strategy (i.e., emphasizes similar competitive methods) will comprise a strategic group (Porter, 1980).

Research Instrument. Following a review of Porter (1980), an instrument was inductively derived to evaluate the various competitive methods that

might be used to characterize a particular generic strategy. The content validity of the questionnaire was enhanced through a review of questionnaire items used by previous strategy researchers (Bourgeois, 1980; Child, 1975; Khandwalla, 1976). In order to pretest the research instrument in a field setting, the CEOs of four manufacturing firms, not included in the final sample, were interviewed to ascertain the comprehensiveness and phrasing of the questionnaire items.

Next, the relevance of particular competitive methods for firms within the industry was ascertained through the use of a semi-structured interview with the chief executive officer (or designated executive) in each of the sample firms within the industry chosen for the study—the paints and allied products industry. During the interview the executive was asked to identify those members of the top management team who are most influential in the making of strategic decisions for the firm. By incorporating the richness of anecdotal information about the firm, the industry within which it competes, and methods of competition in that industry, the researchers were able to modify the instrument in order to enhance its ability to capture competitive methods that identify the strategic orientation of a firm's decision makers. In order to generalize across the sample, the same instrument was administered to all respondents.

The interviews with the executives of the pretest and sample firms led to several improvements in both the wording and the composition of the list of competitive methods. A modification that helped refine the final instrument illustrates the benefit of on-site interviews. The presence of intense price competition was mentioned by several respondents and suggested the inclusion of the item "competitive pricing." The sentiments of the executives in this regard are largely consistent with a U.S. Department of Commerce industry report that stated that the profit-after-taxes as a percent of sales for the paint industry (the site of this study) was 2.25 percent, compared to an average for all manufacturing industries of 5.25 percent. The report further suggested that the depressed profits were largely attributed to a price-cost squeeze, reflected by the 1978 Producers Price Index for paint of 192.3 (1967 = 100) compared to the average for paint raw materials of 212.7 (*U.S. Industrial Outlook*, 1980).

Sample and Data Analysis. Several criteria were used in the selection of firms within the paints and allied products industry. First, the 4-digit Standard Industrial Classification (SIC) code was chosen as an appropriate measure of the industrial environment. This unit of analysis is supported by Porter (1980). Second, the output of firms had to be concentrated in one line of business to avoid confusion between methods used in competing in multiple businesses. The criterion followed Rumelt's (1974) "single business" or "dominant business" categorization: that is, at least 70 percent of the firm's total sales had to be within a given 4-digit SIC industry. Third, the organization had to be an autonomous, self-contained entity. Thus, the researchers were able to consider corporate-level and business-level strategies as synonymous (Hofer, 1975). Fourth, the organizations had to be

relatively homogeneous in size. This criterion permitted the researchers to control for any potentially confounding effects imposed by wide variations in organizational resources and scope of operations. Fifth, the organizations had to be similar in the technology they employed. Woodward's (1965) classification of manufacturing processes was used to classify the sample organizations as using a batch technology. Finally, the organizations had to be located within a limited geographic area in order to facilitate the performance of the on-site interviews.

Based on an analysis of forces that drive competition, Porter (1980) classifies industries as representative of one of five generic industrial environments: (1) fragmented, (2) emerging, (3) mature, (4) declining, or (5) global. The paints and allied products industry has a 4-firm concentration ratio of less than 40 percent (i.e., 22 percent). There is no true market leader, and there are a large number of small and medium-sized companies, many of them privately-held. These characteristics identify the paints and allied products as highly fragmented, an identification that is confirmed by Porter (1980).

In the field study, 28 nondiversified manufacturing firms in the paints and allied products industry (SIC 2851) were initially contacted. Of these, 22 fully participated. The final industry-specific questionnaire was mailed to each CEO for distribution to the previously identified top management team members. These individuals were asked to indicate the importance of the 21 competitive methods (e.g., customer service, brand identification) to their firm's overall strategy. A 5-point scale was used with values ranging from "1 = Not at all important" to "5 = Extremely important." A total of 78 of 99 possible respondents (79 percent) from the 22 sample firms completed the questionnaire.

Factor analysis of the questionnaire data on competitive methods was used to develop the competitive dimensions associated with each of Porter's generic strategies. Factor analysis has the ability to produce descriptive summaries of data matrices, which aid in detecting the presence of meaningful patterns among a set of variables.

Results of Phase 1. The principal factor solution obtained after the varimax rotation for the 21 competitive methods is shown in Table 1. Although five significant factors (i.e., eigenvalues ≥ 1) emerged from the factor analysis, only the three factors explaining the greatest amount of total variance are shown in Table 1. The other two factors were dropped in the interest of parsimony; additionally, a scree test (Cattell, 1976) indicated that they should be excluded.

The factors displayed in Table 1 are rank ordered from left to right according to the proportion of total variance they explained. The factors are named to reflect the three generic strategies they were interpreted by the writers as representing.

Overall, 15 of the 21 competitive methods exhibited factor loadings greater than or equal to $\pm .50$ on at least one factor. These loadings may be considered to be a conservative criterion; Kim and Mueller (1978) suggest

Table 1
Competitive Methods: Factor Structure and Communalities

	Factor One Differentiation		Factor Two Low Cost		Factor Three Focus		Communalities (h_i^2)
	Factor Loadings (a_{1j})	Squared Factor Loadings (a_{1j}^2)	Factor Loadings (a_{2j})	Squared Factor Loadings (a_{2j}^2)	Factor Loadings (a_{3j})	Squared Factor Loadings (a_{3j}^2)	
Competitive Methods							
V1. New product development	.19858	.03943	.15352	.02357	.62736	.39358	.45658
V2. Customer service	-.26645	.07100	.48492	.23515	.41641	.17340	.47955
V3. Operating efficiency	.29412	.08650	.51166	.26180	-.14168	.02007	.36837
V4. Product quality control	.16526	.02731	.80309	.64495	.02370	.00056	.67281
V5. Experienced/trained personnel	.05293	.00280	.58847	.34630	-.02899	.00084	.34994
V6. Maintain high inventory levels	.24855	.06118	.07925	.00628	-.05166	.00270	.07016
V7. Competitive pricing	.04730	.00223	-.01997	.00040	-.26566	.07058	.07321
V8. Broad range of products	.02949	.00087	-.11203	.01255	.26821	.07194	.08536
V9. Developing/refining existing products	.19764	.03906	.61536	.37867	.34666	.12017	.53790
V10. Brand identification	.82943	.68795	.12707	.01615	.03331	.00111	.70521
V11. Innovation in marketing techniques and methods	.85953	.73879	.20290	.04117	.15055	.02267	.80263
V12. Control of channels of distribution	.70853	.50201	.29166	.08507	.07323	.00536	.59244
V13. Procurement of raw materials	.50326	.25327	.61069	.37294	-.15426	.02380	.65001
V14. Minimizing use of outside financing	.23042	.05309	.50128	.09077	-.11744	.01379	.15765
V15. Serving special geographic markets	.17321	.03000	.10626	.01129	.25196	.06348	.10477
V16. Capability to manufacture specialty products	.08241	.00679	.16097	.02591	.76621	.58708	.61978
V17. Products in high price market segments	.22651	.05131	.00842	.00070	.69132	.47792	.52993
V18. Advertising	.83112	.69076	.01627	.00026	.06969	.00486	.69588
V19. Reputation within industry	.04930	.00243	.78639	.61841	.25484	.06464	.73265
V20. Forecasting market growth	.55085	.34034	.51302	.26319	.17149	.02940	.63293
V21. Innovation in manufacturing processes	.44429	.19739	.61579	.37920	.11464	.01314	.58973
Eigenvalue	6.7871		2.2416		1.8101		10.8388
Percent of common variance	62.60		20.74		16.66		100.00
Percent of total variance	32.3		10.7		8.6		51.6

factor loadings of .30 as a cutoff for significance. Similarly, Nunnally suggests that "it is doubtful that loadings of a smaller size be taken seriously, because they represent less than ten percent of the variance of the factor" (1978, p. 423). Two of the competitive methods (i.e., V13, and V20) loaded highly on more than one factor, indicating that they may be germane to more than one generic strategy.

A common methodological weakness that might threaten the reliability and validity of the factor analytic results is the possible instability of the factor loadings. Instability of the factor loadings because of sampling error may result from the use of a relatively small ratio of subjects ($n = 78$) to measures ($n = 21$). This ratio of 3.7 approaches but does not exceed the desirable but conservative ratio of four or five to one advocated by some authors (Hair, Anderson, Tatham, & Grablovsky, 1979). The sample size does exceed that suggested by Lawley and Maxwell (1971) for the maximum likelihood solution method of confirmatory factor analysis. They suggest that this test is appropriate if the sample contains at least 51 more cases than the number of variables under consideration. Furthermore, given the exploratory nature of the research question as well as constraints—time, resources, availability of firms—inherent in field research, the sample size of this study is not considered a significant limitation in interpreting the results.

Phase 2: Panel Study

A panel of experts was used to develop normative recommendations regarding the appropriate content of each of Porter's (1980) three generic strategies. The panel consisted of seven academicians selected on the basis of their experience and expertise in the field of strategic management. The panel was used to evaluate Porter's (1980) concepts regarding generic strategies because of the common core of knowledge they possessed relevant to the area of inquiry. Each panel member was asked to review Porter's chapter on "Generic Competitive Strategies" and then complete three questionnaires, one for each of Porter's three generic strategies. Each questionnaire consisted of the same 21 competitive methods and associated 5-point scales used in the field research. The panel members were asked to indicate the importance of each competitive method for each generic strategy. The data were analyzed to determine whether experts would uniquely organize the competitive methods for each strategy. Furthermore, because "expert judges will not show well-known biases as leniency, halo, etc." (Einhorn, 1974, p. 562), it is reasonable to expect that the variables being measured actually represent explanatory concepts when combined into global constructs.

Results of Phase 2. The descriptive statistics (means, standard deviations) developed for the panel's responses are shown in Table 2. The statistics were used to evaluate which competitive methods the experts considered most important for each of Porter's generic strategies. Table 2 indicates

Table 2
Panel Technique: Descriptive Statistics

Competitive Methods	Differentiation Strategy		Overall Low Cost Strategy		Focus Strategy	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
V1. New product development	4.71	.49	2.29	1.25	3.71	.49
V2. Customer service	4.29	.49	1.71	.49	4.29	.76
V3. Operating efficiency	2.57	.53	5.00	.00	3.00	1.00
V4. Product quality control	4.29	.49	3.00	1.00	3.57	.79
V5. Experienced/trained personnel	4.57	.53	3.57	.98	3.57	.53
V6. Maintain high inventory levels	2.57	.53	3.14	1.21	2.57	1.27
V7. Competitive pricing	1.71	.49	4.86	.38	3.57	.79
V8. Broad range of products	1.14	.69	2.14	1.07	2.43	.53
V9. Developing/refining existing products	4.00	1.00	3.86	.69	3.29	1.11
V10. Brand identification	5.00	.00	1.86	.69	4.57	.53
V11. Innovation in marketing techniques and methods	4.86	.38	1.71	.76	4.14	.90
V12. Control of channels of distribution	4.14	.69	3.00	1.41	3.29	.49
V13. Procurement of raw materials	2.43	.53	4.86	.38	2.71	.76
V14. Minimizing use of outside financing	2.29	.49	3.29	.95	2.43	.79
V15. Serving special geographic markets	2.71	1.25	1.57	.79	4.86	.38
V16. Capability to manufacture specialty products	3.86	1.07	1.14	.38	5.00	.00
V17. Products in high price market segments	4.57	.53	1.29	.49	3.71	.76
V18. Advertising	4.71	.49	2.43	1.72	3.86	1.07
V19. Reputation within industry	4.29	.49	2.57	.98	3.50	1.04
V20. Forecasting market growth	3.29	.49	4.00	.82	2.86	.69
V21. Innovation in manufacturing processes	2.57	1.13	4.14	1.07	3.71	1.38
Mean item value	3.60		2.93		3.55	
Mean standard deviation		1.07		1.21		.74

that the panel of experts identified some competitive methods as either most or least important for each of the generic strategies. The analysis clarified the relationships between the competitive methods and the generic strategies and aided in the interpretation of the factor analysis developed from the field study.

Comparison of the Results of Phase 1 and Phase 2

An important step in the data analysis for Phase 1 involved a comparison between: (1) the principal factor solution with varimax rotation for the 21 competitive methods used in the field study and (2) the opinions of the panel as to the appropriate content of each of the generic strategies. These findings are summarized in Table 3.

Table 3 is presented on the basis of Porter's three generic strategies. Under each generic strategy, the competitive methods identified by the managers and the panel of experts are arrayed as *most* and *least important*. For the field study, the most important competitive methods were those items whose factor loadings were greater than $\pm .50$. The least important competitive methods were those items whose factor loadings were between $+.30$ and $-.30$ (Kim & Mueller, 1978; Nunnally, 1978). For interpretive purposes, competitive methods that exhibited either their highest or lowest loadings

on the two factors that were excluded from analysis were not incorporated into Table 3. For the panel, the most important and least important competitive methods consisted of those items whose mean value was greater than or less than, respectively, one standard deviation from the aggregate mean.

Table 3
Content of Generic Strategies: Summary of Findings

<i>Experts</i>	<i>Differentiation</i>	<i>Managers</i>
	<i>(most important)</i>	
V1. New product development	V10. Brand identification	
V10. Brand identification	V11. Innovation in marketing techniques and methods	
V11. Innovation in marketing techniques and methods	V12. Control of channels of distribution	
V18. Advertising	V13. Procurement of raw materials	
	V18. Advertising	
	V20. Forecasting market growth	
	<i>(least important)</i>	
V7. Competitive pricing	V2. Customer service	
V8. Broad range of products		
V13. Procurement of raw materials		
V14. Minimizing use of outside financing		
<i>Experts</i>	<i>Overall Low Cost</i>	<i>Managers</i>
	<i>(most important)</i>	
V3. Operating efficiency	V3. Operating efficiency	
V7. Competitive pricing	V4. Product quality control	
V13. Procurement of raw materials	V5. Experienced/trained personnel	
V21. Innovation in manufacturing processes	V9. Developing/refining existing products	
	V13. Procurement of raw materials	
	V19. Reputation within industry	
	V20. Forecasting market growth	
	V21. Innovation in manufacturing processes	
	<i>(least important)</i>	
V2. Customer service	V8. Broad range of products	
V11. Innovation in marketing techniques and methods	V15. Serving special geographic markets	
V15. Serving special geographic markets	V18. Advertising	
V16. Capability to manufacture specialty products		
V17. Products in high price market segments		
<i>Experts</i>	<i>Focus</i>	<i>Managers</i>
	<i>(most important)</i>	
V2. Customer service	V1. New product development	
V10. Brand identification	V16. Capability to manufacture specialty products	
V15. Serving special geographic markets	V17. Products in high price market segments	
V16. Capability to manufacture specialty products		
	<i>(least important)</i>	
V6. Maintain high inventory levels	V3. Operating efficiency	
V8. Broad range of products	V6. Maintain high inventory levels	
V13. Procurement of raw materials	V7. Competitive pricing	
V14. Minimizing use of outside financing	V12. Control of channels of distribution	
	V13. Procurement of raw materials	
	V14. Minimizing use of outside financing	
	V21. Innovation in manufacturing processes	

The results suggest that factor one consists of competitive methods identified by the experts as most important to a differentiation strategy. Three of the four competitive methods identified by the panel for this generic strategy are contained in factor one. This close association led the researchers to interpret factor one as representative of a differentiation strategy. This interpretation is supported further: only one (i.e., V13) of the competitive methods identified by the panel as least important appeared with a high loading on factor one. Many of the competitive methods loading highly on factor one appear to be indicative of a marketing orientation (e.g., brand identification). Porter (1980) notes that one of the principal economic causes for the existence of highly fragmented industries is high product differentiation, particularly if it is based on image.

Similarly, factor two contains three of the four competitive methods identified by the panel as most important to an overall low cost strategy. Factor two suggests a predominantly production orientation (e.g., operating efficiency). Such an orientation lends support to the identification of factor two as representative of Porter's overall low cost strategy. Porter contends that "achieving a low overall cost position often requires a high relative market share or other advantages, such as favorable access to raw materials" (1980, p. 36). Although there has been some empirical research to refute the requirement for a high relative market share in order to obtain a low cost position (Hall, 1980), it should be noted that one of the competitive methods with a high loading on this factor was V13 (i.e., procurement of raw materials). As with factor one, interpretive support is indicated; none of the competitive methods regarded by the panel as least important to this strategy appeared with high loadings on factor two.

More similarity appeared between the panel and managers on what does not rather than what does constitute a focus strategy. Three of the four competitive methods seen by the panel as least important in a focus strategy appeared in factor three with their lowest factor loadings. However, those competitive methods (e.g., V16—specialty products—and V17—high priced market segments) exhibiting high loadings on factor three do suggest an emphasis on specific market segments and imply concentration on a particular niche.

Phase 3: Strategic Group Membership and Organizational Performance

Phase 3 uses the responses from the 19 firms whose CEO, rather than a "designated executive," was the primary respondent. The chief executive is most important in strategy formulation (Chandler, 1962). Chief executives' perceptions of their organizations' strategies are more closely aligned to external measures of strategy than are the perceptions of other executives (Hambrick, 1981b). Therefore, the CEOs' responses were used to categorize firms into clusters reflecting similar intended strategies. Performance data were provided for 15 of these firms and were used to analyze differences in performance among the clusters. This reduction in the sample size

is regrettable but not uncommon in the study of privately-held firms (Porter, 1979).

The researchers calculated individual factor scores for each CEO on each of the three factors corresponding to Porter's (1980) three generic strategies in accordance with the following formula:

$$f_i = a_{i1}z_1 + a_{i2}z_2 + \dots + a_{ij}z_j,$$

where: a_{ji} is the factor score coefficient for competitive method j ($j = 1, \dots, 21$) on factor i ($i = 1, 2, 3$), and z_j is the CEO's standardized value on competitive method j .

The factor scores generated for each of the CEOs were used as input to a K means clustering algorithm (Dixon, 1975). The CEOs were switched from one cluster to another until the optimal cluster configuration, which maximizes between and minimizes within cluster variances, was obtained. The clusters consisted of subsets of CEOs that were more similar or closer to each other in orientation than they were to CEOs outside the cluster.

Initially a three cluster solution was chosen in order to facilitate comparison with Porter's typology of three generic strategies. However, the three cluster solution did not adequately distinguish among the clusters. Consistent with the exploratory nature of this research, a four cluster solution also was examined. The clusters that resulted consisted of CEOs who were most similar in respect to the factors (generic strategies) that had emerged from Phase 1 of this study.

The overall significance of the cluster solutions obtained was tested by means of a one-way analysis of variance—based on the assumption that the scores in each of the various groups have approximately the same variance. However, because the various groups do not contain the same number of subjects, a Bartlett's Box F -test on the within-cell variances was used to test for homogeneity among variances.

Using Parsons' (1956) classification of organizations by type of goal or function, the organizations in this study would be classified as oriented toward economic production. Therefore, consistent with the "economic primacy" of the subject organizations, the derived goals of the financial community (e.g., profitability, growth) should be considered of primary importance in the assessment of organizational performance. Consequently, the researchers obtained "total firm sales" figures for the period 1976 to 1980 to determine "sales growth" and "average after tax return on total assets" from 1976 to 1980 to determine profitability. Annual sales growth rates for the five-year period ranged from .8 percent to 37.7 percent, and average after tax return on total assets ranged from 1 percent to 42 percent for the sample.

An F -value was calculated using a one-way analysis of variance to decide whether there were significant differences among the strategic groups (clusters) on the basis of their mean values for the two performance measures. To determine where the significant differences lie, Scheffé's posteriori

contrast test was used to compare all possible pairs of performance means. Among the various multiple comparison tests, Scheffé's is considered to be the most conservative test (Huck, Cormier, & Bounds, 1974). This test also offers the advantages of applicability to groups of unequal sizes and is relatively insensitive to departures from normality and homogeneity of variances (Hays, 1963).

Results of Phase 3: The Three Cluster Solution. The profiles of the three strategic groups that emerged from the cluster analysis and the performance results are presented in Table 4.

Table 4
Summary of Cluster Analysis Results and Performance Relationships:
The Three Cluster Solution

<i>A. Mean Scores</i>					
<i>Cluster</i>	<i>Coordinate Centroids</i>			<i>Performance</i>	
	<i>Differentiation</i>	<i>Overall Low Cost</i>	<i>Focus</i>	<i>Annual Sales Growth^a</i>	<i>Return on Total Assets^b</i>
1 (<i>n</i> = 12)	.5057 (.4332) ^c	.2437 (.8034)	.4000 (.5247)	.197	.118
2 (<i>n</i> = 4)	-.5063 (.5977)	-.3723 (.3266)	-1.2356 (.3484)	.084	.055
3 (<i>n</i> = 3)	-1.0351 (.6462)	-.1808 (.7499)	.5225 (.4516)	.308	.044
Grand Means	.1441	.0470	.0750		
<i>B. Mean Squares</i>					
	<i>Differentiation</i>	<i>Overall Low Cost</i>	<i>Focus</i>		
Between groups	2.9503	.6616	4.3692		
Within groups	.3083	.6162	.2751		
<i>d.f.</i>	2,16	2,16	2,16		
<i>F</i> -ratio	9.568	1.074	15.883		
<i>P</i> -value	.001	.388	.001		
Bartlett's Box <i>F</i> -test = .086, <i>p</i> = .917					

^aAnalysis of variance results for the three clusters: $F = 5.531$, $p = .022$

^bAnalysis of variance results for the three clusters: $F = .724$, $p = .507$

^cStandard deviations are in parentheses.

The one-way analysis of variance procedure indicated that the three clusters of firms were significantly different from each other on the basis of their emphasis on the differentiation strategy ($p < .001$) and the focus strategy ($p < .001$) but not on the basis of the overall low cost strategy ($p = .388$). The researchers had anticipated that each of Porter's three generic strategies would be required to distinguish clearly the different strategic emphases that existed among the clusters of firms. Thus, the inability of the low cost dimension to account for significant differences among the three clusters was unanticipated and provided the rationale for developing the four cluster solution.

The first cluster had its highest centroid score on the differentiation strategy, and it was the only cluster that displayed a positive score for the differentiation strategy. Cluster number two displayed negative scores for all

three of the generic strategies. This lack of a positive score on any of the three generic strategies indicates that firms comprising this group have failed to develop their strategy in at least one of Porter's (1980) three directions. Cluster number three exhibited the highest positive score of any cluster for the focus dimension and negative scores for the other two generic strategies.

Taken in combination, the pattern of centroid scores that emerged from the cluster analysis led the researchers to identify cluster one as representative of a strategic group of firms oriented primarily toward a differentiation strategy. However, the pattern of scores was not conclusive (i.e., the relatively high scores on the alternative generic strategies indicated the possibility of emphasis on more than one generic strategy within this cluster of firms). Cluster number three appears to consist of a group of firms emphasizing a focus strategy. Cluster number two evidences an apparent lack of commitment to any of Porter's generic strategies. Therefore, this cluster may be comprised of firms that are "stuck in the middle" (Porter, 1980, p. 41). This does not imply that firms that are stuck in the middle do not emphasize certain competitive methods that are key components of one or more generic strategies; however, the composite strategy that emerges may lack internal consistency.

The next step in the analysis was to compare performance among the three clusters of strategic groups. Table 4 indicates that the three strategic groups were not significantly different from one another with regard to profitability as measured by return of assets ($p = .507$). However, for the other performance measure, annual sales growth, Table 4 indicates that strategic group membership was significant ($p = .002$). This finding is consistent with Porter's (1980) contention that firms that adopt a generic strategy should outperform those stuck in the middle. Cluster one, the differentiation strategy group, averaged 19.7 percent annual sales growth; cluster three, the focus group, averaged 31 percent annual sales growth; and cluster two, stuck in the middle, averaged only 8 percent annual sales growth. The Scheffé test for significant differences among the groups on the performance measure "sales growth" shows that the mean value for the focus strategy group is significantly greater than the mean value for the stuck in the middle group. None of the other differences is significant.

Results of Phase 3: Four Cluster Solution. The profiles of the four strategic groups that emerged from the cluster analysis and their links with organization performance are presented in Table 5. The four cluster solution resulted in the splitting of cluster number one in Table 4 into two separate and unique clusters labeled one and four in Table 5. The composition of clusters numbered two (i.e., stuck in the middle) and three (i.e., focus) remained intact from the three cluster solution to the four cluster solution.

The one-way analysis of variance procedure indicated that the four clusters of firms were significantly different from each other on the basis of their emphasis on the differentiation dimension ($p < .003$), the focus dimension ($p < .001$), and the overall low cost dimension ($p < .001$). Table 5 shows

Table 5
Summary of Cluster Analysis Results and Performance Relationships:
The Four Cluster Solution

<i>A. Mean Scores</i>					
<i>Cluster</i>	<i>Coordinate Centroids</i>			<i>Performance</i>	
	<i>Differentiation</i>	<i>Overall Low Cost</i>	<i>Focus</i>	<i>Annual Sales Growth^a</i>	<i>Return on Total Assets^b</i>
1 (<i>n</i> = 4)	.3268 (.5254) ^c	1.2685 (.1444)	.6226 (.8757)	.201	.255
2 (<i>n</i> = 4)	-.5063 (.6902)	-.3723 (.3771)	-1.2356 (.4023)	.084	.055
3 (<i>n</i> = 3)	-1.0351 (.7914)	-.1808 (.9185)	.5225 (.5531)	.308	.044
4 (<i>n</i> = 8)	.5951 (.4195)	-.2687 (.4445)	.2887 (.3176)	.170	.089
Grand Means	.1441	.0470	.0750		
<i>B. Mean Squares</i>					
	<i>Differentiation</i>	<i>Overall Low Cost</i>	<i>Focus</i>		
Between groups	2.0309	2.5417	3.0119		
Within groups	.3161	.2372	.2736		
<i>d.f.</i>	3,15	3,15	3,15		
<i>F</i> -ratio	6.425	10.715	11.009		
<i>P</i> -value	.003	.001	.001		
Bartlett's Box <i>F</i> -test = .567, <i>p</i> = .638					

^aAnalysis of variance results for the four clusters: $F=3.89$, $p=.041$

^bAnalysis of variance results for the four clusters: $F=3.24$, $p=.069$

^cStandard deviations are in parentheses.

that although cluster one displays positive centroid scores for each of the three generic strategies, the emphasis on overall low cost strategy is clearly dominant. Also, the primary orientation for the fourth cluster is a differentiation strategy. Thus, though the three cluster solution was anticipated to parallel Porter's three generic strategies, the four cluster solution affords an interpretation that is more consistent with Porter's framework.

It is important to note that cluster analysis, unlike most parametric statistical techniques, does not explicitly provide a clearly acceptable or unacceptable solution. It merely provides a structure so that relationships may emerge; thus, it is important to make explicit the criteria that guided the selection of an appropriate solution. In the present case, both subjective and objective criteria led to the selection of the four cluster solution as the more appropriate. The subjective criterion involved an identification of how many clusters theory would lead one to expect. Initially, three clusters were anticipated, one for each of Porter's three generic strategies. The appearance of the stuck in the middle group as a cluster in the initial three cluster solution suggested that the third generic strategy—overall low cost—which had not appeared as a significant determinant of group structure may have been pooled into one or more of the other groups. The most important objective criterion was the appearance of a significant *F*-value for the overall low cost factor when the number of clusters was increased from three to four.

The validity of these findings and interpretations is enhanced by the strong relationship between the composition of the clusters and anecdotal information obtained from the CEOs during the on-site interviews. A brief discussion of a typical firm from each of the four clusters in Table 5 will convey this convergence. The CEO of a firm in the overall low cost cluster stressed the primacy of high productivity in manufacturing operations. Production incentives and extensive reinvestment in modern facilities and equipment were mentioned as very important. Uncertainties regarding product-market scope seemed to characterize the responses of one of the CEOs whose firm was in the stuck in the middle cluster. Perhaps the relatively low performance of his firm may be attributed to the lack of a well articulated and consistent strategy because of a lack of continuity (mentioned by the CEO) in the composition of the top management team. The CEO of one of the firms in the focus cluster emphasized the importance of successfully competing within a particular product-market niche. Favorable relations with key distribution channels (i.e., painting contractors) were considered to be highly important. Lastly, the CEO of one of the firms in the differentiation cluster asserted that his firm's success lay more in differentiating the firm than the product. He contended that his firm's reputation for "superior service and quick reaction to customer needs" enabled it to enjoy a high profit margin by charging a premium for his product. These remarks are clearly consistent with Porter's generic strategies.

The next step in the analysis was to compare performance among the four clusters or strategic groups. Table 5 indicates that differences among the four strategic groups regarding return on total assets approached statistical significance ($p = .069$). This represents a noticeable improvement over the results of the three cluster solution. The highest average annual return on total assets (25.5 percent) was achieved by cluster one with its emphasis on overall low cost; followed by cluster four—differentiation—with 8.9 percent; cluster two—stuck in the middle—with 5.4 percent; and cluster three—focus—with 4.4 percent. The Scheffé procedure indicated that the differences between cluster one and cluster four were significant ($p < .05$).

For the other performance measure—sales growth—the overall F -ratio indicated that the groups were significantly different from one another ($p = .041$). Cluster three—focus—was the leader with 31 percent annual sales growth; followed by cluster one—overall low cost—with 20 percent; cluster four—differentiation—with 17 percent; and cluster two—stuck in the middle—with 8 percent. The Scheffé procedure indicated that the difference between cluster two and cluster three with regard to sales growth was significant ($p < .05$).

Discussion

Phase 1 of this study analyzed the competitive methods considered to be most important by the top management of firms competing within a

single highly fragmented industry. Three sets of internally consistent competitive methods were identified that conformed to Porter's (1980) three generic strategies. The ability of questionnaire data to identify different "intended" strategies in industrial settings has been supported by others (Bourgeois, 1980; Hambrick, 1980). However, such an approach, with its emphasis on "intended" strategies, has rarely been used to examine the presence of strategic groups and their relationships to organizational performance.

The pattern of competitive methods that emerged from the field study closely resembled that obtained in Phase 2 from the panel of experts and provides additional support for the authors' interpretations. In addition to identifying competitive methods of high importance, the managers and the panel also identified items of lesser importance for each generic strategy. This convergence implies that these managerial orientations are indicative of the two generic strategies that Porter (1980) identified as differentiation and overall low cost. However, the normative recommendations of the panel for the third of Porter's generic strategies—focus—did not clearly coincide with the third orientation of the managers.

The inability to identify clearly the third managerial orientation as reflective of a focus strategy may be due, at least in part, to what some regard as a limitation of the focus strategy as currently outlined by Porter. Hofer (1982), for example, proposed that when a firm deals in a market composed of different segments, it may, for any given product, choose to utilize either a common appeal across all the various segments within which the product competes *or* the firm may tailor different appeals for specific customer groups. Under such a broader view of a focus strategy it may not be possible to prescribe a single set of competitive methods applicable for all the potential strategy combinations within this single generic strategy. An important implication is that equifinality (von Bertalanffy, 1955) may characterize focus strategies, that is, there is a broad range of different but internally consistent sets of competitive methods available to firms employing a focus strategy.

The cluster analysis used in Phase 3 was based on the assumption that clusters of firms could be identified that would correspond to a model of strategic groups based on Porter's three generic strategies. Two of the clusters that emerged in the three cluster solution did appear to represent Porter's differentiation and focus strategies. However, the overall low cost dimension did not appear as significant in determining the composition of organizational strategies. Further, the apparent emphasis on more than one generic strategy, reflected in the cluster centroid scores of cluster one, led the researchers to investigate the possibility that aggregation of dissimilar firms may have occurred within the three cluster solution. The four cluster solution served to disaggregate the larger cluster ($n = 12$) previously identified as differentiation into two separate clusters. Each cluster reflected a unique strategic orientation—differentiation ($n = 8$) and overall low cost ($n = 4$)—as well as different levels of organizational performance.

An important finding of the study is the apparent lack of *singularity* in strategic orientation that characterizes the highest performance group—cluster number one. This group had the highest performance on the return on assets criterion and the second highest performance on sales growth. On the basis of its centroid scores, this cluster was identified as *primarily* oriented toward an overall low cost strategy. However, this group also emerged with the highest centroid score on the focus strategy. Given Porter's (1980) caution against the commitment to multiple generic strategies, the high performance exhibited by the members of this cluster may appear inconsistent. However, as Cyert and March (1963) suggest, high performance may generate slack resources that can be used to enable firms to expand their present scope of operations. Also, constraints posed by budget limitations may require that a firm limit its emphasis to only one market segment.

The present cross-sectional research design inhibits the ability to do more than infer causal relationships. To a large extent the viability of inferences drawn from a cross-sectional measurement of organizational strategies relies on the concept of strategic momentum (Miller & Friesen, 1980). The persistence of strategies over time may result from decision making processes as well as industry characteristics. The view of organizations as conservative and resistant to change is promulgated by the Carnegie group (Carter, 1971; Cyert & March, 1963; March & Simon, 1958). Also, the presence of intra-industry barriers to mobility (Caves & Porter, 1977; Harrigan, 1982; Oster, 1982) may require such an investment of scarce resources as to make strategic change or exit costly if not prohibitive. Oster asserts:

To have significance for the allocation of resources, a strategy must necessarily involve some commitment that it is irreversible, at least for a time. It is difficulty of movement that makes group structures potentially important (1981, p. 377).

In the case of small organizations, the scarcity of resources and the high risk attendant with strategic change may help to explain why organizations continue to pursue marginally profitable strategies. The problems may be compounded in the presence of privately-held firms because of the lack of publicly available information by which to judge the strategies and performance of other firms.

In summary, the research findings are generally consistent with Porter's contention that commitment to at least one of the three generic strategies will result in higher performance than if the firm fails to develop a generic strategy (i.e., becomes stuck in the middle). Additionally, the findings that the overall low cost cluster had the highest average return on total assets support prior research by Woo and Cooper (1981) and Hamermesh, Anderson, and Harris (1978) that rejects the notion that high market share is a requirement for the successful implementation of a low cost strategy. Porter also comments that "low cost may be achievable without high share" (1980, p. 44). However, it may be important for competitors to identify with a generic strategy that does not place them in direct competition with a large number of firms evidencing a similar strategic orientation. For example, a large number of firms in the sample were identified as pursuing a differentiation strategy, and this may have inhibited the ability of firms in this

strategic group to realize as high a level of performance as those in other less populated groups. Lastly, the group of firms identified with a focus strategy may illustrate a potential for trade-offs between growth and profitability. The focus group was the highest performing group on sales growth but had the lowest level of return on assets. The findings in this respect are consistent with the recent empirical findings of Trostel and Nichols (1982), which indicated that privately-held firms may choose to emphasize sales growth as a decision criterion at the possible expense of profitability.

Limitations of the Study

Limitations of this study should be noted. First, the generalizability of the study is limited because the firms used in the study represent only one of Porter's (1980) five generic industrial environments. The relative importance of the competitive methods may vary across as well as within industry environments. For example, Porter posits that the emphasis on cost control and service orientation may be of greater strategic importance for firms competing within a fragmented industry than an emergent industry.

Second, the relatively small sample of firms and executives included in the field study may lead to some instability in the factor loadings obtained from the factor analysis (Kim & Mueller, 1978; Nunnally, 1978). However, given the exploratory nature of the study and resource constraints inherent in field research, this limitation is not considered a major barrier in interpreting the results.

Third, the instrument administered to the executives was used to determine "intended" firm strategies and may have served to enact the environment (Weick, 1979) to which the subject responded. Thus, executives may have overintellectualized on what they actually did or attempted to do (Duncan, 1979) in the formulation of their firm's strategy. Alternatively, the parsimony of the instrument may have excluded important competitive methods used by a firm. Thus, the instrument may not fully capture the richness or complexity of a firm's intended strategy.

Fourth, the strategy realized by an organization may be different from that intended by the decision makers (Hambrick, 1981a; Mintzberg, 1978). An observed discrepancy between intentions and realized strategy may arise from the inability of the firm to translate its intended strategies into actions because of unpredictable environmental change, a lack of appropriate implementational capabilities, or unrealistic expectations (Mintzberg, 1978). Singly, or in combination, these factors may result in an emergent strategy that is observed to be different from the intended strategy.

Fifth, because all of the sample firms were privately-held, secondary sources for confirmation of reported data were unavailable. However, the authors believe that the time, effort, and cooperation extended by the managers of the sample firms as well as the researchers' assurances regarding confidentiality and sharing of the results of the study enhanced the reliability of the information provided.

Implications for Future Research

Future research could establish the similarities that exist among the various typologies that have been proposed for classifying firms. For example, to what extent is Porter's classification of firms stuck in the middle compatible with Miles and Snow's (1978) reactors or Miller and Friesen's (1978) stagnating firms? The goal would be to develop a parsimonious typology capable of classifying the array of strategic configurations available within an industry. Such synthesis would serve to answer a recent call for "developing or isolating composites which take the form of . . . 'gestalts,' 'archetypes,' and 'configurations'" (Miller & Mintzberg, 1983, p. 57).

The study of publicly-held firms would provide access to secondary sources of data, which then could be used to determine if firms classified on the basis of strategic choice would be similarly classified on the basis of structural configurations exhibited by the firm. The use of maximally different methods could provide strong evidence for the validity of a particular typology.

Some evidence has emerged that strategies appear to be enduring over time (Miller, 1981). Systematic research on a longitudinal basis would reveal whether performance within and among strategic groups classified on the basis of strategic orientation varies over time. One may posit, for example, that as the industry life cycle progresses, the firms stuck in the middle may actually be able to adapt to changes in the industry environment more readily than firms committed to a specific strategy.

Finally, the role of strategic choice as a method of classifying strategic groups may vary across as well as within industries, as suggested by Hambrick (1983a), Snow and Hrebiniak (1980), and others.

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The Choice of Strategic Alternatives Under Increasing Regulation in High Technology Companies¹

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The strategic response of U.S. high technology companies in the medical X-ray manufacturing industry to increased governmental regulations from 1962 to 1977 is examined. Results suggest that regulations increase consumer and competitor uncertainty, with the consequence that firms select less risky strategies and decrease the riskier new product invention strategy. Larger firms reduce inventions less than smaller firms.

A central proposition of organization theory is that decision makers respond to environmentally induced uncertainty through responses that attempt to adapt their organizations in order to reduce their uncertainty. Uncertainty is defined as a lack of information about future events so that adaptation alternatives, and particularly their outcomes, are unpredictable (Hickson, Hinings, Lee, Schneck, & Pennings, 1971). Although much of the theoretical discussion has focused on whether these adaptive responses are able to lead to organizational survival in the long run (Aldrich, 1979) or short run (Pfeffer & Salancik, 1978), the actual choices of specific responses under different conditions has remained largely unexplored empirically. The point of this paper is to report on research that investigated the adaptation strategies of firms in one industry to regulations over time.

Five strategic choices used by high technology firms to respond to regulation are examined. The central argument tested is that as regulatory uncertainty increases, customer uncertainty and competitor uncertainty are expected to increase; and, as this occurs, firms will choose strategies that have more predictable outcomes. However, larger firms are expected to be better able to engage in the more uncertain invention strategy than smaller firms.

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Background

The theoretical development for the choice of strategic alternatives has been based largely on Hickson et al. (1971) and Katz and Kahn (1978). Hickson et al. (1971) suggested that when faced with uncertain environments, organizational decision makers select alternatives for managing or coping with uncertainty from three sets of choices: prevention alternatives, forecasting alternatives, and absorption alternatives. Prevention alternatives are those that forestall the emergence of unpredictability. Forecasting alternatives attempt to reduce uncertainty by anticipating environmental changes in sufficient time to allow for preemptive response. Absorption alternatives attempt to minimize the damage from environmental uncertainty that was neither prevented nor forecast. Pennings (1981) as well as Scott, Mitchell, and Birnbaum (1981) have extended the concept of Hickson et al.'s (1971) three response sets to specific alternatives within each set.

In addition to the work by Hickson et al. (1971) and its extensions, the work by Katz and Kahn (1978) has broadly classified adaptation strategies into direct and indirect sets. Direct strategies are those that attempt to reduce environmental uncertainty by either direct internal control or external control through incorporation. Katz and Kahn's (1978) system classifies the invention strategy as a form of internal direct control because it is the product of an internal system that is structured to meet environmental threats or changes. Diversification is classified as external control through incorporation because it aims at controlling the environment. Increasing the size of the board of directors, adding outside members to the board, and joining trade associations are classified as strategies employed by organizational decision makers in indirectly attempting to reduce environmental uncertainty by co-opting supporters and building external constituencies.

Organizational environments are composed of other organizations that are both essential and nonessential for the focal organization's goal accomplishment. Those essential goal-relevant organizations most commonly have been referred to as the task environment (Thompson, 1967), although they also have been referred to as the relevant environment (Dill, 1958) and the organization set (Evan, 1966). The task environment is composed of goal-relevant organizations such as government regulatory agencies, customers, and competitors. Each of these organizations can pose uncertainty for the focal organizations' successful adaptation. Regulatory uncertainty is associated with the actions of governmental agencies that create and enforce regulations. Customer uncertainty is associated with changes in product demand and is typically reflected in sales. Competitor uncertainty is associated with market structure.

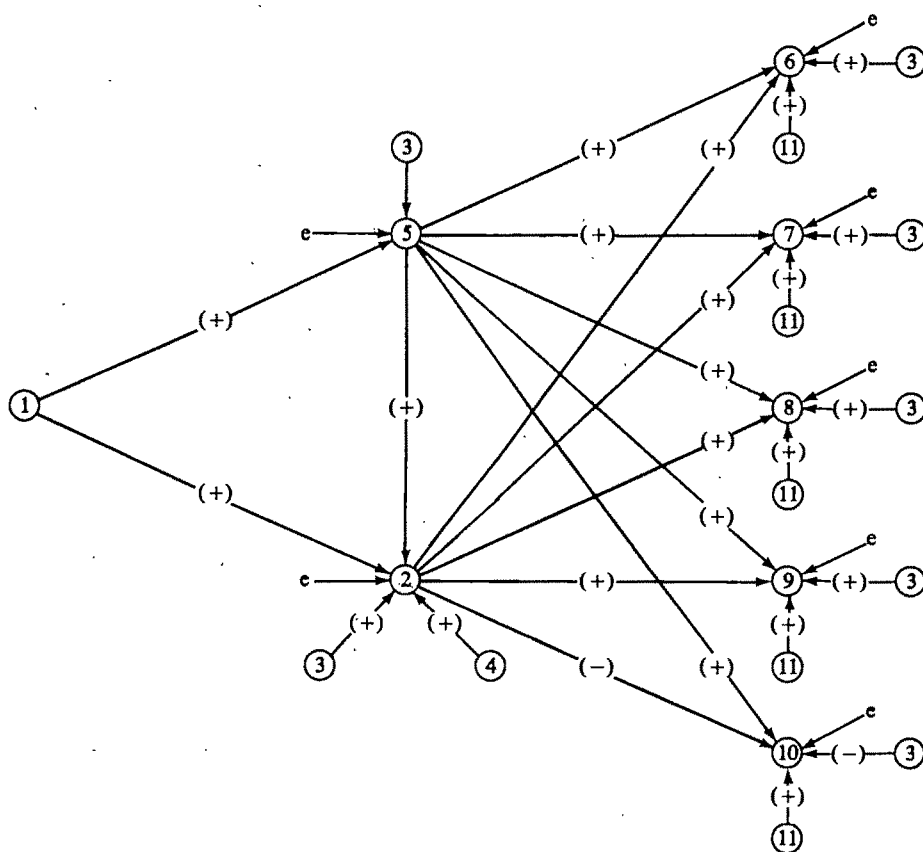
In addition to environmental uncertainty, the alternative strategic choices available to the organization have uncertainty associated with their outcome. Invention of new products is an inherently uncertain undertaking (Nelson & Winter, 1977) fraught not only with the risk of failure early in the process, but throughout as the invention is tested, developed, and

brought to market. Relative to invention, other strategic choices are lower in uncertainty.

More specifically, as regulatory uncertainty leads to increased uncertainty for customers and for the firms competing in an industry, decision makers will select adaptation strategies based on the increasing likelihood of being able to predict their outcomes. However, these choices will be a function of the source of uncertainty and of firm size.

The hypothesized relationships are indicated in the path model presented in Figure 1. Referring to Figure 1, it is hypothesized that regulatory uncertainty will be positively related to both customer and competitor uncertainty. Further, regulatory uncertainty is expected to be only indirectly related to strategic alternatives and to competitor uncertainty. Customer uncertainty is expected to be related directly to the strategic alternatives as

Figure 1
Hypothesized Model*



*1: Regulatory uncertainty; 2: competitive uncertainty; 3: hospital certificate-of-need requirement; 4: X-ray market growth; 5: customer uncertainty; 6: diversification; 7: outsiders on board of directors; 8: size of board of directors; 9: trade association memberships; 10: invention; 11: size of firm.

well as indirectly through competitor uncertainty. Competitor uncertainty is expected to be directly related only to each strategic alternative. For the present study of companies in the medical X-ray manufacturing industry, exogenous variables that are expected to affect the set of relationships between endogenous variables are regulation of hospitals through certificate-of-need requirements in various states, the overall growth of the medical X-ray market, and firm size.

Of the 11 variables analyzed, 5 were common to all firms in the industry (hereafter termed industry variables) and 6 were firm-specific variables. The five industry variables are regulatory uncertainty, customer uncertainty, competitive uncertainty, certificate-of-need requirements, and market growth. The six firm-specific variables were diversification, outsiders on the board, board size, trade association memberships, inventions, and organizational size.

Industry Level Variables

Regulatory Uncertainty. The first industry variable, regulatory uncertainty, is the unpredictable changes in regulations, not merely increasing regulation, that create the regulation's uncertainty. In fact, a smooth predictable increase in regulations might lead to increased certainty for many organizations. This, however, is not usually the case in general or in the specific situation investigated here.

Two basic types of regulations are distinguishable: (1) environmental, health, and safety regulations (EHS) and (2) economic regulations of firms in the transportation, communication, and energy sectors of the U.S. economy. The present study focuses on EHS regulation.

Changes in EHS regulations, including their initiation, implementation, and enforcement, take place unpredictably over time. The Congress holds hearings and invites comment, in many instances, as the result of public outcries to exposure from television set X-ray emissions, thalidomide, or the Dalkon Shield. Industry representatives together with other affected or interested parties, such as Ralph Nader's Health Research Group, participate by providing testimony. The bill introduced before Congress may take unexpected forms, depending on factors such as the testimony presented, the committee and Congressional membership, the nature of the issue, and the closeness of future elections. Once passed into law, the bill is subject to challenge and litigation, which again affects its form and interpretation. Having met its legal challenges, the regulation's implementation is subject to the enforcement philosophy of the particular regulatory agency responsible for enforcement. The age of the regulatory agency, its past history with industry, and its need to legitimize its actions to the public at large and to self-appointed public interest groups all influence how the regulation is then enforced.

Customer Uncertainty. The second industry variable of concern is customer uncertainty. The regulatory uncertainty just described creates

uncertainty for the customers of regulated products by increasing their awareness of a real or potential problem with the product and by increasing their uncertainty over the safety and quality of products offered for sale prior to finalizing the standards (many are never finalized but are continuously refined over time). Customers may be reluctant to purchase products that they suspect will be unsafe or that they suspect might not meet EHS regulatory standards in the future and for which they may be required to upgrade at their own expense later.

Customer uncertainty over product safety is expected to be greater in consumer product than industrial product markets because of the greater expertise of industrial consumers in being able to judge the technical requirements of the product and its current and future ability to meet EHS requirements. However, consumer uncertainty still exists for industrial products, and in either case it typically is reflected in product sales as consumer demand fluctuates in anticipation of future safety improvements. This reasoning leads to the first hypothesis:

H1: Increased regulatory uncertainty will increase customer uncertainty.

Competitive Uncertainty. Competitive uncertainty is the third industry variable of concern. Regulatory uncertainty is expected to affect not only customer uncertainty, but also the market's structure both directly and indirectly. Regulatory actions may control rates charged, as in economic regulation of the communication and public utility industries or by establishing performance standards as in the EHS regulation of the pharmaceutical industry. In either case such actions may control market entry by increasing the costs necessary for a new firm to gain access. These barriers to entry may, in turn, stabilize the number of competing firms.

Record keeping requirements, audits, enforcement actions, and (in circumstances such as pharmaceuticals) prior approval from the regulatory agency before new products are introduced into the market all act to increase the costs and cycle time from invention to market. In so doing, uncertainty concerning the firm's anticipated risk-return ratio is increased.

As the costs of meeting regulations increase, smaller and marginal firms may be forced out of the market, thereby increasing the concentration of competitors. If, in addition, customer uncertainty leads to sales instability, smaller and marginal firms will be forced out of the market even faster, and new firms will be even more reluctant to enter the market. As increasing costs and unstable expected returns erect barriers to entry for new firms and squeeze out smaller and marginal competitors, markets will move up the concentration ladder from nearly purely competitive to oligopoly to monopoly.

Despite Bernhardt and MacKenzie's (1971) report that uncertainty increased continuously with concentration, Pfeffer (1972), Pfeffer and Nowak (1976), and Stern and Morgenroth (1968) have all reported a curvilinear relationship in which the highest competitive uncertainty is in intermediate concentration levels in which the four or eight largest firms control 40

percent to 60 percent of the market (oligopoly) and the least uncertainty is under higher and lower concentration levels.

Uncertainty, however, is not the same for all organizations in a market. The evidence to date indicates that firms of different sizes confront different degrees of competitive uncertainty for a given concentration level. The research by Stern and Morgenroth (1968) and Scherer (1967a, 1967b, 1970) indicates that smaller firms face more uncertainty and the larger firms face less uncertainty for a given concentration level because of differences in their market power.

Market Growth. The fourth industry level variable of concern is market growth. In addition to the effects of regulatory and customer uncertainty, market structure may depend on whether the market is growing, declining, or remaining relatively stable in terms of sales. Growing markets with high future potential, perhaps because of higher profit margins, new technologies, or unexploited market segments, might attract new firms in spite of present regulatory and customer uncertainty. Alternatively, declining markets with low future potential may increase in concentration as firms leave for better opportunities in growing markets.

Certificate-of-Need Requirements. The fifth variable of concern in the present study is the certificate-of-need requirements imposed by state regulatory agencies on the customers of the medical X-ray manufacturing industry. Investment controls by government agencies began when New York State adopted the first certificate-of-need law in 1964. By 1974, 23 states and the District of Columbia had enacted such laws (U.S. Department of Health, Education, and Welfare, 1978). Of these states enacting local certificate-of-need requirements prior to 1974, only Oklahoma excluded hospitals, the major market for X-ray equipment (Salkever & Bice, 1979). The major empirical investigation of the impact of certificate-of-need requirements on hospital investment concluded that they actually stimulated growth in hospital equipment purchases (including presumably X-ray units). But the U.S. Department of Commerce continued to consider certificate-of-need reviews as detrimental to the medical X-ray manufacturing industry's growth (U.S. Department of Commerce, 1979). Therefore, both certificate-of-need requirements for customers as well as market growth for suppliers need to be controlled in order to examine the effects of EHS regulations on manufacturers' strategic choices. These arguments lead to the second and third hypotheses.

H2: Controlling for market growth and certificate-of-need requirements, increased customer uncertainty will increase competitor uncertainty.

H3: Controlling for market growth and certificate-of-need requirements, increased regulatory uncertainty will increase competitor uncertainty.

Firm-Specific Variables

Inventions. The first firm-specific variable of concern is the invention of new products by a firm. Two competing theoretical frameworks for explaining the effect of regulation on the invention strategy have been developed. Some economic theorists, such as Galbraith (1952), have argued that highly concentrated industries with high barriers to entry facilitate the selection of more risky invention choices leading to technological progress because: (1) these economic conditions tend to boost profits, thereby providing the needed financial resources to engage in risky R&D; and (2) the inventors are protected from imitators likely to steal the idea and thereby reduce the monetary gains that are necessary to induce the risk. The first part of Galbraith's argument is similar to the concept of slack induced long term innovation as proposed by Cyert and March (1963). At the technical level, Allen, Utterback, Sirbu, Ashford, and Holloman (1978) have argued that regulation is conducive to invention because it provides clearer specifications of performance, which reduces the inventor's design uncertainty. Regulations help to specify more clearly the design envelope within which the invention must conform. These clearer specifications help to speed up the process by allowing the inventors to gauge their progress more accurately in terms of meeting requirements such as cost, weight, energy consumption, resolution, channel isolation, or dosage rates.

Opposing the theoretical view that the choice of the riskier invention alternative is enhanced by regulation is the theoretical position that regulation, by increasing the market's concentration, may act to drive out the smaller, more adaptive and therefore more inventive firms from the market. The economic evidence is abundant that although the number of inventions increases continuously with firm size, it decreases in efficiency for firms above the medium size range, roughly \$75 million to \$200 million sales, in most industries (Greer, 1980). The technical argument of Allen et al. (1978) described previously also is opposed by Rubenstein and Ettlie (1979). They argued that regulation may focus inventions to meet clearer standards of performance, but it also may retard invention of alternative and perhaps better solutions to the problem addressed by the mandate. These arguments find their counterpart in Cyert and March's (1963) proposal of a problem or need focused theory of short term innovation in which smaller firms without sufficient slack or that experience problems engage in probabilistic search. Failure or lack of success thus leads to search that leads to new solutions, that is, inventions. To the extent that less successful firms are also smaller, this is a perspective compatible with the view that smaller firms are more inventive (at least for short term problem solving inventions).

A major problem with the evidence and theory to date on these alternative views of choice of the riskier invention alternative is the failure to account for differences in the technical opportunities available in different industries (Nelson & Winter, 1977), the level of enforcement of the regulations, and the cause and effect linkages in the chain of events (Hill, 1975).

In the present study, technical opportunity is controlled by sampling one industry. The level of enforcement is controlled by analyzing one regulation and enforcement agency. The cause and effect linkages are considered explicitly through the use of path analysis as opposed to methods such as time-series analysis.

The argument here is that when technical opportunities and enforcement levels are explicitly controlled, invention as a strategic alternative will decline for all firms, but larger firms will be more inventive because they will be best able to risk the uncertainty of invention because of greater slack. This reasoning is presented in the fourth and fifth hypotheses.

H4: Controlling for firm size, increased customer and competitive uncertainty will increase the choice of less risky strategic alternatives (diversification, outsiders on the board, board size, joining trade associations).

H5: Controlling for size, increased customer uncertainty and competitor uncertainty will reduce the choice of the riskier invention strategy.

Organizational Size. The second firm-specific variable is organizational size. Some have argued that large size and its resulting formalization and standardization (Child, 1973) decreases the organization's ability to innovate (Scherer, 1970). However, large organizations should have greater slack because they have greater sales, more capital and human assets, and consequently a greater capacity to absorb the uncertainties posed by regulation. Therefore, larger organizations should be more able to engage in long term risky inventions as well as less risky alternatives.

H6: If competitive uncertainty and certificate-of-need requirements are controlled, larger firms will develop more inventions than smaller firms.

Diversification. The third firm-specific variable of concern is the organization's diversification strategy. Diversification represents a prevention strategy (Scott et al., 1981) that attempts to exert direct control (Katz & Kahn, 1978) over the environment by spreading the risk to the firm from any single product market. The threat of loss from any single product market is offset, hopefully, by the opportunity for gain in another product market.

Outsiders on the Board. The fourth firm-specific variable concerns changes in the composition of the firm's board of directors by increasing the proportion of outsiders. This alternative strategy may be achieved either by maintaining the same absolute board size, but substituting outsiders for insiders, or by adding outsiders to the existing board and thereby increasing its size.

Increasing the proportion of outsiders on the board should allow for more indirect control over the environment (Katz & Kahn, 1978) through better forecasting of what otherwise would be unpredictable behavior by critical elements of the focal organization's task environment. Such forecasts are thought to provide the focal organization with concurrent insider information about the other organizations' likely actions (Scott et al., 1981) or by

insuring a steady supply of critical resources such as capital or labor (Pennings, 1980). Thus, bankers who represent sources of financing or labor leaders (e.g., Chrysler) may appear as directors.

Board Size. The fifth firm-specific variable concerns increased board size, which, as indicated above, may result from adding outsiders to an existing board without replacement or, alternatively, from adding more outsiders, or a combination of insiders and outsiders. Increasing the number of outsiders is a strategy that increases the representation of important external constituent groups. Such a strategic alternative would enable an organization to maintain greater direct control over its external dependencies (Katz & Kahn, 1978) by insuring a favorable balance of voting strength on any board, particularly one that includes outsiders.

Trade Association Memberships. The sixth and final firm-specific variable concerns trade association memberships. Organizations may join together into trade associations in order to forecast changes (Scott et al., 1981) or to exert indirect control over their environment (Katz & Kahn, 1978) by amplifying the influence of any single firm in pending legislation or in negotiating with regulatory bodies. Trade associations then may seek to work singly or in combination with other associations to reduce uncertainty for its members.

These strategies for reducing environmentally induced uncertainty may be pursued separately or in combination. Table 1 presents strategic alternatives together with their classification.

Table 1
Strategic Alternative Classification

Strategic Alternatives	Classifications			
	Uncertainty	Pennings (1981)	Scott et al. (1981)	Katz & Kahn (1978)
Invention	High	Prevention	Prevention	Direct control-internal
Diversification	Low	—	Prevention	Direct control-external
Outsiders on board	Low	Forecasting	Forecasting	Indirect control
Size of board	Low	—	Forecasting	Indirect control
Trade association	Low	—	Forecasting	Indirect control

The Industry

A single industry is examined here to control for the effect of different technical opportunities between industries. This industry, the medical X-ray manufacturing industry, is a high technology area vital to the health and welfare of society and an important link in the U.S. balance of payments (U.S. Department of Commerce, 1979). It has had close ties with the semiconductor and computer fields and is the industry in which the 1979 Nobel Prize in Physiology or Medicine was jointly awarded to Allan Cormack of Tufts University and Godfrey Hounsfield of EMI, Ltd. for pioneering the CAT (for computerized axial tomography) scanner (DiChiro & Brooks,

1979). The CAT scanner, however, has been the only radically new invention since X-rays were discovered. Most inventions have been aimed at long term product improvements.

The Regulations

X-rays, however, have not been without their dangers. In the year after their discovery X-rays were first used to treat breast cancer, and the first X-ray injury was reported. These early injuries led the first British Roentgen Society to propose radiation protection in 1915, which was adopted in England in 1921 and in the United States by the American Roentgen Society in 1922. The industry was essentially self-regulating until 1967, when the public learned that the General Electric Company had recalled 90,000 color television sets. As a result of public concern, the U.S. Congress introduced several bills to regulate X-ray devices (Brodeur, 1977). These bills resulted in P.O. 90-602, the Radiation Control for Health and Safety Act of 1968, which was signed into law by President Johnson on October 18, 1969. On August 1, 1976, President Ford signed P.L. 94-295, the Medical Device Amendments of 1976, which further regulated the manufacture of radiological devices used in medicine.

The Radiation Control for Health and Safety Act of 1968 authorized the Secretary of Health, Education, and Welfare (HEW) to establish a broad program to coordinate, conduct, and support research on radiation hazards and to develop and administer performance standards that would minimize unnecessary emissions of X-rays and other radiation from electronic products. The Environmental Control Administration's Bureau of Radiological Health (BRH) was given responsibility for administering its provisions and promulgated its medical X-ray standard in 1974.

The standards authorized by the 1968 act were of intermediate severity. They were not as severe as those that required premarket clearance, as the pharmaceutical industry standards did or as the 1976 Medical Device Amendments would. Nor were they so lenient as to require only registration of manufacturers and importers. They did require changes in manufacturing procedures, record keeping, and testing of products that were subject to BRH inspection. Existing equipment manufactured prior to the standards was protected by a "grandfather clause," but all new X-ray equipment manufactured or imported for sale in the United States was required to meet the new safety standards. These standards basically improved the shielding, reduced exposure time, and improved the accuracy of the X-ray beam.

Method

Data

Data were obtained from archival sources, questionnaire responses, and interviews. With one exception, the analysis was based on archival data.

This one exception was the use of questionnaire data for measuring the trade association membership variable. However, even in this instance, trade association membership lists for available years were used to verify the questionnaire responses. The interview and remaining questionnaire data were used to provide the background necessary to classify and interpret the quantitative analysis.

In March 1980, 11 in-depth semistructured interviews of up to two hours were held with congressional representatives and administrators from the Bureau of Radiological Health, the Bureau of Medical Devices, the National Electrical Manufacturers Association, the Health Industries Manufacturing Association, and the American Association for Medical Instrumentation. These interviews gathered qualitative data on appropriate classification systems to use in analyzing the archival data as well as improving questionnaire response rates and providing insights into the context of regulation and the relationships between organizations. The classification that emerged from these interviews divided manufacturers by size and by those manufacturing original equipment and those manufacturing component assemblies (e.g., X-ray tubes).

Questionnaire responses were collected in 1980 from firms representing 62 percent of the medical diagnosis and medical therapy market segments (75 percent response rate). These questionnaire responses were limited to being cross-sectional and, except for trade association memberships, were not on a directly comparable time scale to the archival records also collected. Questionnaire responses allowed the medical diagnosis and medical therapy market segments of the industry to be identified further; the original equipment manufacturers from these segments are reported here.

Based on the interviews and questionnaires, seven firms were identified for which archival data were available that accounted for 78 percent of the medical diagnostic market and 90 percent of the medical therapy market in 1980. These seven firms ranged in size from a firm with \$18 billion in total 1977 sales to a firm with \$35 million in total 1977 sales.

It is possible that if the share of the market accounted for by the top four firms remained constant over the 16-year period, the concentration ratio would approach an ipsitive measure of the top four firms in comparison to the other three firms in the sample. In order to check for this possibility, data from 1974 on market share were obtained (Hale & Hale, 1975). Comparing the 1980 data obtained from questionnaires with these 1974 data, major changes in market leadership were identified. Unfortunately, market share data were not available prior to 1974. However, based on an average growth rate of 23.3 percent over the total 16 years studied in constant 1972 dollars (20.8 percent growth through 1974 and 33.7 percent after) the medical X-ray market grew in excess of the U.S. economy throughout the 16-year period. In addition, one would expect even greater competition and volatility over market share earlier in the growth phase (e.g., growth between 1961 and 1962 was 1 percent) as firms sought to increase their share so as to increase their volume, lower their costs, and achieve

higher profitability. Only the dominant firm in the industry retained its relative rank increasing its market share from 22.5 percent to 30 percent between 1974 and 1980. The sixth ranked firm in 1974 with a 10 percent share of the market increased its share to 18 percent in 1980, ranking second. The fourth ranked firm in 1974, with a 12.5 percent share, increased its share to 16 percent by 1980 and ranked third. The third ranked firm in 1974 dropped out of the top seven entirely by 1980, along with the fifth ranked firm. Clearly, the concern over a possible ipsitive measure is not based on the facts within this industry.

In addition to helping identify the dominant firms in the market, questionnaire responses also were used to verify interview data that patent applications were a meaningful measure of new product invention in this industry, that the development of new products was important for each firm's economic success, and that firms sought to stabilize their regulatory environment in order to reduce uncertainty.

Archival data were collected from U.S. Government documents, corporate records, investor services, and trade association records from 1962 to 1977. Government statistics on industry sales and market concentration were obtained at the 4-digit Standard Industrial Classification (SIC: 3693) level or finer (SIC: 3693101 = diagnostic and 3693105 = therapy). Both segments of the medical X-ray manufacturing industry were included in the analysis because all firms studied participated in both segments. Coverage ratios were greater than .90 in all situations in which governmental data were used. However, these 16 years of data were limited by the various classification methods in use, the time of collection, and the degree of market coverage.

Measurement

Variables, 11 in number, were measured from 1962 through 1977 in a pooled cross-sectional time-series design with the firm as the unit of analysis. This design used data for each of seven firms (cross-sectional) over the 16-year (1962-1977) period (time-series). There were, therefore, 112 data points ($7 \times 16 = 112$) for each of the 11 variables measured.

Each of the 11 variables was measured as an attribute of each of the seven firms over each of the 16 years. These 11 variables include the five industry variables that were common to each of the seven firms in a particular year as well as six variables that varied between firms in the same year as well as over different years.

Although the five-industry variables were common to all seven firms in each year, they also were attributes of each firm because they were "affected by environmental variation in the same sorts of ways" (Hannan & Young, 1977, p. 61). Actions by the regulatory agency were available to all firms within the industry. Each firm also had the market share of each firm in the industry available to it. The changes in total industry sales, certificate-of-need requirements, and the value of shipments were all indicators that were equally available to all seven firms for each year and that affected each firm in the same ways.

The key assumptions here are that all firms had equal access to these data and were likely to be affected similarly. These assumptions are warranted because of several key characteristics of this industry. First, the firms were all members of the same trade association, which issued frequent informational announcements to its members on areas of common interest such as government actions and industry sales. Second, the government regulatory agency frequently publicly announced the results of its activities. Finally, it also is reasonable to assume that these seven firms were aware of this information because they were fiercely competing for market share in a high technology growth market, and to ignore these sources of information would have meant early failure after substantial investment.

The five variables that were common to all seven firms within each year obviously did not vary between firms within a given year, but each of the variables did vary over time. Although there was no cross-sectional variation, the sample size remained 112. Therefore, the estimation of path coefficients such as P_{21} is based on 112 observations and not 16. The interested reader should refer to Hannan and Young (1977) for further discussion on this point.

Five industry level variables were measured. The first of these, regulation uncertainty under the Radiation Control for Safety and Health Act, was measured by the annual frequency of activities such as standards promulgation and enforcement actions as reported in the Bureau of Radiological Health's annual reports. The second industry variable, consumer uncertainty, was measured by industry sales' volatility from the annual percentage change in the industry's value of shipments adjusted for inflation (Pfeffer & Salancik, 1978). Competitive uncertainty (oligopoly) was the third industry level variable and was measured from the market concentration of the four largest firms from indices reported by the Bureau of the Census every four years; intervening years were estimated by interpolation. The fourth industry level variable, certificate-of-need requirements, was measured by the annual number of hospitals (American Hospital Association, 1962-1977) for states with certificate-of-need requirements (Salkever & Bice, 1979). This variable represents the annual percentage of continental U.S. hospitals under certificate-of-need requirements from 1962 through 1977. The fifth and last industry variable, market growth in the medical X-ray industry, was measured as the log of the value of shipments adjusted for inflation in each year from 1962 through 1977.

In addition to these five industry level variables, six variables were measured for each of the seven industry firms over time. Each firm was measured individually on its diversification, percentage of outsiders on the board of directors, board size, relevant X-ray industry trade association memberships, patent applications, and total sales (size). Diversification was measured by the annual number of 4-digit standard industrial classification codes each firm participated in each year (Comanor, 1965; Grabowski, 1968; Scherer, 1965). It would have been desirable to have data on the organizational structure of each firm over the 16 years in order to assess the form

of indirect control exerted on the innovation process, such as the number of technical marketing directors. But these data were not available, and therefore a cruder indicator of indirect control was used. This indicator was the percentage of outsiders as measured by the annual number of board members who were not and had not been company officers (Pfeffer, 1972). Board size was measured by the annual total number of board members (Pfeffer, 1972). Trade association memberships were measured by identifying trade associations from the 1980 questionnaire responses and verifying them with annual trade association membership lists. Invention was measured by each firm's annual patent applications (Hill, 1975) in patent class 250 (radiant energy). Organizational size was measured by each firm's annual total sales that had the highest intercorrelation of three alternative measures. Total sales correlated higher with total assets ($r = +.91$) and total employees ($r = +.92$) than assets and employees did with each other ($r = +.82$).

The variables, their source, means, standard deviations, and ranges are listed in Table 2. As the descriptive statistics in Table 2 indicate, all variables except trade association memberships exhibited considerable variation. Therefore, except for trade association memberships, it can be said with reasonable confidence that the relationships or lack of relationships between variables were due to covariation between variables and not due to the lack of sufficient variance for any particular variable.

Analysis

The analysis used the five industry level variables common to each firm in any single year (regulatory uncertainty, customer uncertainty, competitive uncertainty, market growth, and certificate-of-need), all measured at the firm level of analysis, together with the six variables measured uniquely for each of the seven firms each year in a path analysis using a pooled cross-sectional time-series design with the firm as the unit of analysis.

The pooling of cross-sectional and time series data is to be recommended for clarifying causal sequences and for understanding dynamic processes (Hannan & Young, 1977). Several analytical procedures are available for estimating parameters with data in this form. However, the dual assumptions of homoscedasticity and cross-sectional independence must be met for cross-sectional data as well as the assumption of uncorrelated residuals over time if unbiased estimators are to be obtained. Fortunately, well known procedures exist for meeting both sets of assumptions. The procedure used here was initially to test for autocorrelation by conducting an ordinary least squares (OLS) analysis. This initial analysis indicated the presence of autocorrelation, which would cause the OLS parameter estimates to be biased. The autocorrelation in the time series was corrected by using a first order autoregressive model in which the autoregressive parameter ρ was estimated by a least squares procedure using a Cochrane-Orcutt type iterative procedure (White, 1978). This correction procedure eliminates the need to

Table 2
Variable, Source, Measurement, Descriptive Statistics

Variables	Source	Level	Mean	Standard Deviation	Minimum	Maximum
1. <i>Regulatory uncertainty</i> : Annual variation in sum of BRH activities to issue new or revised standards and enforce compliance.	U.S. Dept. H.E.W., Bureau of Radiological Health (BRH) Annual Reports (1962-1977)	Industry	10.38	15.99	0	43
2. <i>Customer uncertainty</i> : Annual variation in industry value of shipments adjusted for inflation.	U.S. Dept. of Commerce (1962-1977), <i>Current Industrial Reports</i> .	Industry	23	19	1	76
3. <i>Competitive uncertainty</i> : Annual variation in concentration ratio for four largest firms in industry.	U.S. Dept. of Commerce, Bureau of Census (1962-1977), <i>Census of Manufacturers</i> .	Industry	58.69	6.75	48	67
4. <i>Market growth</i> : Annual log of industrial value of shipments adjusted for inflation.	U.S. Dept. of Commerce (1962-1977), <i>Current Industrial Reports</i> .	Industry	14.06	13.97	2	46
5. <i>Certificate-of-need</i> : Annual percentage of continental U.S. hospitals under certificate-of-need requirements.	American Hospital Association (1962-1977); Salkever and Blice (1979)	Industry	28.69	35.83	0	99
6. <i>Invention</i> : Annual patent applications in patent class 250 (radiant energy)	U.S. Patent Office records	Firm	.54	1.06	0	4
7. <i>Organizational size</i> : Annual total sales.	Annual reports	Firm	1664.9	3597.4	0	17519
8. <i>Diversification</i> : Annual number of four digit SIC codes.	<i>Poor's Register</i> 1962-1977	Firm	4.29	5.38	0	25
9. <i>Outsiders on Board</i> : Annual percentage of board members who were not and had not been company officers.	Annual reports	Firm	34.71	16.69	0	78
10. <i>Board size</i> : Annual total number of board members.	Annual reports	Firm	13.46	5.71	0	32
11. <i>Trade association</i> : Annual number of trade association memberships.	Questionnaire responses and trade association membership lists.	Firm	.23	.42	0	100

use difference scores or other methods to reduce the autocorrelation. The interested reader should refer to Dhrymes (1971) for a detailed discussion of this procedure.

The assumption of homoscedasticity and cross-sectional independence was corrected using the least squares with dummy variable (LSDV) procedure (Hannan & Young, 1977; Kmenta, 1971) and alternatively firm size. In both cases, results were similar and the findings reported in the next section report only the controls for size because they directly relate to the hypotheses. Because the only cross-sectional variance to be explained was in the six individual firm variables, this procedure helped insure that the two cross-sectional assumptions were met. The five industry level variables did not vary across firms and, therefore, there was not cross-sectional variance to be explained or controlled.

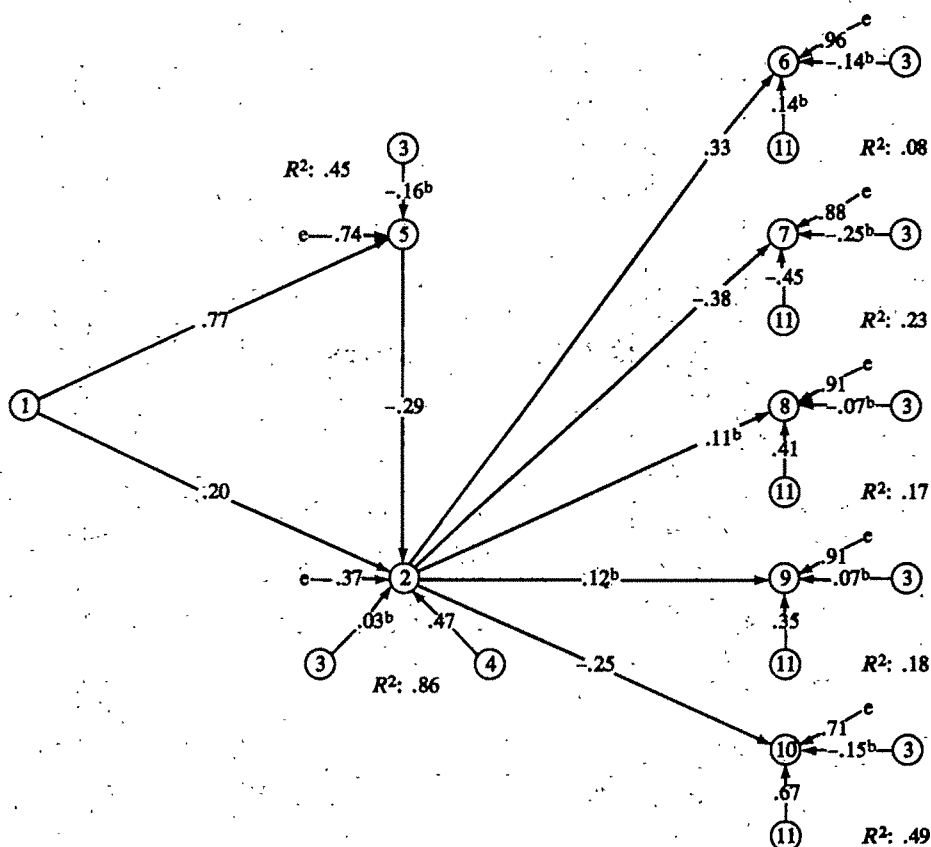
Path analysis rather than more traditional time-series analysis was used because it was the most appropriate method to explore the network of cause and effect linkages (Hannan & Young, 1977), one of the major weaknesses of previous studies as noted earlier (Hill, 1975). Path analysis is essentially a method that uses sequential regression analysis of standardized antecedent and dependent variables at various points in the model, which allows the zero-order correlations between variables to be broken down into direct and indirect effects with a direction of causality suggested by the set of structural equations used (Blalock, 1971).

Results

The theory of organizational response to increased external uncertainty argues that large and small firms will seek to reduce the uncertainty by increasing the less risky strategies such as diversification, outsiders on the board, board size, and trade association activities, and reducing riskier strategies such as the invention of new products. However, because of their size and additional organizational slack, larger firms were predicted to be able to engage in the riskier invention strategy better than smaller firms, even under conditions of increased uncertainty. The findings presented in Figure 2 and Tables 3 and 4 generally support these arguments.

Referring to Figure 2 and the supplemental data in Tables 3 and 4, the regulatory activities of the Bureau of Radiological Health directly affected customer uncertainty ($P51 = +.77$), supporting the first hypothesis. Contrary to the second hypothesis, customer uncertainty was found to decrease rather than increase competitor uncertainty. This effect would seem most likely to occur when the customer uncertainty acts as an entry barrier, keeping new entrants out and causing marginal firms already in the industry to leave. Regulatory uncertainty positively increased competitive uncertainty directly ($P21 = +.20$), supporting the third hypothesis. Certificate-of-need requirements were not significantly related to competitor uncertainty ($P23 = +.03$). Increased competitor uncertainty, in turn, was found to have a significant effect on diversification ($P62 = +.33$), percentage of outsiders

Figure 2
Final Model^a



^a1: Regulatory uncertainty; 2: competitive uncertainty; 3: hospital certificate-of-need requirement; 4: X-ray market growth; 5: customer uncertainty; 6: diversification; 7: outsiders on board of directors; 8: size of board of directors; 9: trade association memberships; 10: invention; 11: size of firm.

^bNot significant at .05 level or greater.

R^2 : Amount of variance explained.

on the board ($P72 = -.38$), and invention ($P102 = -.25$), supporting the fourth and fifth hypotheses.

In order to interpret these findings accurately it is necessary to understand the nature of the variation in market concentration from 1962 to 1977. The industry began this period with the largest four firms controlling 67 percent of the market, and over time the market became less concentrated, ending in 1977 with the four largest firms controlling 48 percent of the market. Thus, the market became increasingly oligopolistic during this period and, hence, given the earlier discussion, more uncertain. Therefore, increasing competitive uncertainty led to increasing diversification, fewer outsiders on the board, and less invention. Firm size was found to lead to significantly

Table 3
Causal Relationships for Figure 2^a

Endogenous ^b	Variables Exogenous ^c	Parameter ^d	Causal				R ²	e
			Total Covariance I	Direct II	Indirect III	Total IV (II + III)		
5	1	P51	.77	.77	0	.77	0	
5	3	P53	-.16	-.16	0	-.16	0	.74
2	1	P21	.03	.20	-.22	.02	-.01	
2	5	P25	-.29	.29	0	.29	0	
2	3	P23	.03	.03	0	.03	0	
2	4	P24	.47	.47	0	.47	0	.37
6	2	P62	.33	.33	0	.33	0	
6	3	P63	-.14	-.14	0	-.14	0	
6	11	P611	.14	.14	0	.14	0	.96
7	2	P72	-.38	-.38	0	-.38	0	
7	3	P73	-.25	-.25	0	-.25	0	
7	11	P711	-.45	-.45	0	-.45	0	.88
8	2	P82	.11	.11	0	.11	0	
8	3	P83	-.07	-.07	0	-.07	0	
8	11	P811	.41	.41	0	.41	0	.91
9	2	P92	.12	.12	0	.12	0	
9	3	P93	.07	.07	0	.07	0	
9	11	P911	.35	.35	0	.35	0	.91
10	2	P102	-.25	-.25	0	-.25	0	
10	3	P103	-.15	-.15	0	-.15	0	
10	11	P1011	.67	.67	0	.67	0	.49

^aThese path coefficients were estimated from the full path model.

^bEndogenous variables are those that are to be explained by other variables specified in the system.

^cExogenous variables are those whose causes are assumed to be outside the causal model.

^dPath parameters refer to the standardized regression coefficients between endogenous and exogenous variables. For example, P51 refers to the standardized regression coefficient between endogenous variable 5 (customer uncertainty) and exogenous variable 1 (regulatory uncertainty).

Table 4
Standardized and Nonstandardized Coefficients, Standard Error,
and Confidence Intervals in Figure 2 Model Parameters

<i>Path</i>	<i>Path Coefficient (Standardized Regression Coefficient - Beta)</i>	<i>Nonstandardized Regression Coefficient β</i>	<i>Standard Error of β</i>	<i>t-Value (d.f.)</i>
P51	.77	.02	.002	8.59** (109 d.f.)
P53	-.16	-.002	.001	-1.70 (109 d.f.)
P21	.20	.07	.22	-3.22** (107 d.f.)
P25	-.29	-3.64	.67	5.47** (107 d.f.)
P23	.03	.006	.009	-.67 (107 d.f.)
P24	.47	1.04	.112	-8.73** (107 d.f.)
P62	.33	.28	.14	-1.98** (108 d.f.)
P63	-.14	-.02	.03	-.85 (108 d.f.)
P611	.14	.0002	.0001	1.53 (108 d.f.)
P72	-.38	-.88	.37	2.41** (108 d.f.)
P73	-.25	-.11	.69	1.62 (108 d.f.)
P711	-.45	-.002	.0004	-5.19** (108 d.f.)
P82	.11	.08	.12	-.64 (108 d.f.)
P83	-.07	-.01	.02	-.46 (108 d.f.)
P811	.41	.0007	.14	4.56** (108 d.f.)
P92	.12	.006	.008	-.73 (108 d.f.)
P93	.07	.0007	.002	.44 (108 d.f.)
P911	.35	.00004	.00001	3.89** (108 d.f.)
P102	-.25	-.04	.02	1.98* (108 d.f.)
P103	-.15	-.004	.003	-1.22 (108 d.f.)
P1011	.67	.0002	.00002	9.61** (108 d.f.)

* $p < .05$, two-tailed test

** $p < .01$, two-tailed test

greater invention (P1011 = +.67), supporting the sixth hypothesis. Firm size also was found to lead to significantly greater trade association memberships (P911 = +.35), board size (P811 = +.41), and percentage of outsiders on the board (P711 = -.45). Apparently the larger firms in this industry were able to overcome the stultifying effects of larger size and use their slack as an effective buffer of uncertainty. Certificate-of-need requirements generally were negatively related to the various strategies but were not found to be significantly different from zero. Thus, certificate-of-need requirements appear to have had little effect on the relationships examined here.

Conclusions

The enforcement of the 1968 Radiation Control Act has only indirectly influenced strategic choices through its effect on market structure. The influence of this regulation has been to increase customer uncertainty, leading the smaller and more marginal firms to leave the market, leading to increased concentration. Simultaneously, however, market growth had a greater impact on market structure by increasing the number of firms entering the market. Apparently the enforcement of this EHS regulation has not had the effect of increasing barriers to entry.

The importance of competitive uncertainty in the strategic choice process has important implications for future research on organizational adaptation. Contrary to expectations, this study has found that only competitive uncertainty affected the choice of adaptation strategies by organizational decision makers. The other sources of environmental uncertainty, such as those imposed by regulators or customers, did not affect the adaptive responses directly, but only as they led to changes in competitiveness between firms. At higher and lower concentration levels, at which competitive uncertainty is less, the impact of regulatory and customer uncertainty on adaptation choices would be expected to be greater. Clearly, these findings imply that in oligopolistic markets, strategic choices depend more on competition among firms than on the other sources of uncertainty. Therefore, the importance of industry concentration may be more important than previously realized in organization theory. The work by Hirsch (1975) provides similar evidence and, together with the findings presented here, may well support increased attention by organization theorists to industrial competition as a predictor of organizational behavior.

These findings also generally support the argument that increased oligopoly leads to an increase in less risky strategies and a decrease in the riskier invention strategy, but with larger firms being more inventive than smaller ones. The strategic alternatives of the larger firms were more varied and hence adaptive, because they included the riskier invention strategy as well as the safer alternatives. The choice of strategies favored by the largest firms included increasing the board's size and joining trade associations. Smaller firms chose less risky strategies by seeking to insure supplies of critical resources through increasing the percentage of outsiders on their boards. The findings here point to an order of decreasing risk from a high of invention down to increased board size, to joining trade associations, to diversification, to a low of using outsiders on the board.

The effect of regulation on invention in the medical X-ray manufacturing industry reveals that its primary impact was positive through increasing customer uncertainty, forcing the smaller and more marginal performing firms out, thereby increasing the industry's concentration. This helped stabilize the environment, which in turn induced firms to engage in increasingly risky invention. These findings thus support the Galbraith (1952) and Cyert and March (1963) argument that long term invention is facilitated by regulations. However, in this particular industry, these positive effects of regulation (for invention) were offset by more firms entering the market because of its growth potential, thus reducing the market's concentration. The increasingly competitive uncertainty because of this oligopolistic market led to an overall reduction in the invention of X-ray devices, although larger firms were more inventive than smaller firms.

However, these findings should be generalized with great caution. The present study is product (radiant energy) and industry specific. This is an industrial products industry characterized by mature product development or static competition (Klein, 1977) with the exception of the CAT scanner (invented and introduced by one of the larger firms, EMI, Ltd.).

Studying a single market over time has the advantage, noted earlier, of controlling for technical opportunities between markets, a major problem with many of the earlier innovation studies. In addition, such an approach allows for a more careful analysis of the effects of specific forms of regulations on specific industries. The variety of government regulations is so great and unpredictable that treating them in any wide brush approach nearly always dooms the results to banal generalities. In spite of these advantages, the disadvantage of the present research strategy is that it has more limited generalizability. Further study, therefore, is needed in other product markets and in other industries on the strategic responses of organizations to specific forms of regulation. Such focused studies should result in a fuller understanding of the critical factors that contribute to a government-industry relationship that protects the public welfare, improves the economic health of the nation, and increases the invention of new and improved products and processes for the mutual benefit of all.

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Merger Strategies as a Response to Bilateral Market Power

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Merger behavior is explored within the framework of the desire to manage resources and market dependencies. It is argued that market power resides in the bilateral relationships between buyer and seller, and that these dependencies influence merger strategy. Results of the study indicate that there is such a relationship between merger strategy and relative market power.

As a general theory, mergers can be considered as simply one strategy for an organization to manage market and resource contingencies in a world of uncertainty. Pfeffer and Salancik, leading proponents of this position, forcibly argue that "the key to organizational survival is the ability to acquire and maintain resources" (1978, p. 2) and that mergers are a strategy for altering organizational interdependence by controlling the context of resource control. This study extends Pfeffer and Salancik's work. It explores merger behavior within the basic framework of resource interdependencies by considering the intervening effect of extended rivalry and relative power between suppliers and customers (Porter, 1976, 1980). The study examines 176 mergers in 11 primary manufacturing industries in order to extract the relationship between merger strategy and relative power between buyers and sellers. Empirical evidence is presented to indicate that there is such a relationship. The evidence is consistent with the view that organizations manage their market and resource interdependencies by means of merger activity, yet not always through the physical extension of their organizational boundaries.

Merger Theories

By invoking standard neoclassical economic arguments, early explanations of merger strategies concentrated primarily on demand side factors, such as the growth and profitability of potential merger partners and their industries. Substantiation of this position has proven elusive, however. Research has historically indicated that diversification does not always lead

to superior corporate performance (Dewing, 1921; Livermore, 1935). Subsequent research by Weston and Mansinghka (1971), Rumelt (1974), Holtzman, Copeland, and Hayya (1975), Salter and Weinhold (1979), and others generally has drawn the same conclusion, though there is some indication that firms diversifying out of inherently low profit industries perform somewhat better in the post-merger environment. There is additional evidence that mergers are made for growth objectives, rather than for profitability objectives (Reid, 1968). Mueller (1969) further developed the "growth" thesis by proposing a "managerialism" explanation of mergers tied to executive compensation.

The pursuit of growth and profitability across product boundaries has led some economists to postulate that a possible motivation for mergers lies in the attainment of "conglomerate power," in which large diversified firms are able to cross-subsidize predatory pricing or confrontation market strategies in one product-market with resources skimmed from other business units (Shepherd & Wilcox, 1979). In fact, many of the corporate strategy portfolio models, such as the popular Boston Consulting Group's growth/share matrix, explicitly outline strategies for cross-subsidization between different business units.

Since the tumultuous merger wave of the middle 1960s, a major rethinking of merger theories has occurred, with many of the current paradigms focusing on the role of input factors in merger and diversification activity. Merger models based on input factor considerations essentially posit that firms will pursue the potential financial and operating economies achieved by the combination of synergistic merger candidates (Ansoff, 1965; Levy & Sarnet, 1970). Although merger theories based on operating synergy appear to be persuasive, studies by Kitching (1967), Rumelt (1974), Christensen and Montgomery (1981), and Kay (1983) suggest that synergy pursuing strategies may be only partially successful.

Set against the notion of synergy pursuit, which would imply a trend toward specialization (synergy-rich) strategies and away from conglomerate (synergy-poor) strategies, are merger models based on risk-spreading behavior. Risk-spreading, as an explanation for diversification activity, follows from risk/return models of securities, in which the different business units of a firm are treated analogously to securities within an investment portfolio (Salter & Weinhold, 1979). In such cases, the corporate decision maker can be considered a risk-aware investor making diversification choices in an uncertain world. The firm selects optimal merger or acquisition candidates based on its risk/return equation. Several studies have indicated, however, that although some company specific risk reduction may have occurred with mergers, it often is counterbalanced by increased market-related risks (Copeland & Weston, 1979).

Recognizing the importance of a systems perspective, Pfeffer (1972) proposed an alternative model of merger behavior by observing that mergers are simply one possible strategy for an organization to manage its environmental interdependencies. The underlying argument is given by Thompson,

who writes, "Organizations under norms of rationality seek to place their boundaries around those activities which if left to the task environment would be crucial contingencies" (1967, p. 39). Specifically, Thompson views vertical integration as "a major way of expanding organizational domains in order to reduce or eliminate significant contingencies" (1967, p. 41). Building on this work and similar organization theoretic positions by Katz and Kahn (1966) and Starbuck (1965), Pfeffer attempted to test the hypothesis that a company would tend to accept a merger that would result in the focal organization becoming relatively more independent.

Based on this concept of resource "absorption" behavior, Pfeffer examined the bivariate correlations between patterns of resource exchange and patterns of merger activity; resource exchange being defined as the percentage of one industry's sales made to another industry and the percentage of one industry's purchases from another industry. Pfeffer found that the more an industry relies on another industry, in terms of selling outputs or purchasing inputs, the more likely an acquisition will occur in that industry.

The arguments of environmental management as a motivating factor behind merger activity are expanded here by considering relative economic power between sellers and buyers. It is contended that relative power tempers the role of resource absorption as a method of resource management and opens the way for alternate merger strategies. Empirical evidence is provided to support this hypothesis.

Market Power and Mergers

It is widely recognized in both the economics and management literature that vertical integration, or resource absorption, is not the only method of managing resource interdependence, and in many circumstances it may not be the best method. Pfeffer and Salancik (1978), for example, identify a number of organizational strategies for managing resource interdependence, including adaptation and avoidance, cooperation through joint ventures, cooptation by interlocking directorates, and social and legal action. This paper focuses on two basic economic options available for securing sources of inputs and markets for outputs: market exchange and internal organization.

A market exchange alternative always exists to in-house absorption strategies. For example, a firm has two basic choices in securing inputs: it can purchase the necessary components in the market place, in which case the distribution of benefits to the contracting parties is a function of the bargaining process, or it can internalize the input market through backwards integration. Firms act as quasi-markets in a sense, and they compete with the viability of the open market as a mechanism for obtaining resources (Coase, 1937). Imperfections in the marketplace create market costs, which, in turn, encourage vertical integration. If market imperfections didn't exist, firms could, in theory, coordinate their resource problem by market

exchange alone, without any need for internal organization. There is a similar argument for absorption of contiguous markets by forward integration when the costs of dealing with immediate customers runs too high. In this light, issues of power must be made explicit.

Broadly speaking, bargaining power is simply the ability to influence prices, contract conditions, distribution perks, and the like, which ultimately affect profitability. Several forces act on a firm's ability to extract favorable outcomes when bargaining with suppliers and customers. Dunlop (1944) and Lindblom (1948) classified the forces that influence bargaining power into three general groups. To summarize:

- (1) *Tastes, goals, and motivations of the bargaining parties.* This includes both personal and organizational levels. Personal factors would include, for example, attitudes about prolonged and difficult negotiations and personal goals such as prestige, money, or growth. Organizational goals may include economic factors such as shareholder profit maximization as well as noneconomic factors such as full employment.
- (2) *Skills in negotiation techniques.* This includes abilities in techniques of persuasion and coercion and the skills to "out-bluff" one's opponent. Dunlop calls this group of skills "pure" bargaining power (1944, p. 77).
- (3) *Market conditions.* This includes the degree and type of competition in all markets, which ultimately affects the firm. In particular, the degree and type of competition in the markets that sell inputs and purchase outputs are significant factors, as is the substitutability of resources and markets.

Although a full discussion of bargaining power should include factors in all three categories listed above, plus other social/political/technical considerations, the present analysis is limited primarily to market condition factors.

Galbraith and Stiles (1983) identified dual conditions for market power: (1) the essentiality of the product, service, or market that a firm provides to others within its chain of production (the movement and transformation of goods from raw material to end user), and (2) the exclusivity by which the firm provides this product, service, or market. The strength of the first condition rests on the notion of extended rivalry and the availability of substitutable resources. The second exclusivity condition gives rise to "monopoly power" and facilitates what Pfeffer and Salancik call "discretion over resource allocation" (1978, p. 47). If one firm, or an exclusive collection of firms, has greater discretion with respect to resources and markets, it should be able to exercise greater power in the chain of production. By itself, a firm's reliance on a particular resource or market does not constitute the major problem. Dependence becomes an issue only when teamed with adjacent supply and purchase markets that are controlled by firms more influential and powerful.

In traditional economics market power usually is defined in terms of the number and concentration of sellers in a market, with the argument that a few major sellers are able to effect oligopoly or monopoly pricing behavior by coordinating market activities and achieving, as a group, greater exclusivity and discretion. Because power relationships are bilateral and are tied together by the mutual dependence of the market participants—buyers must have sellers, and sellers must have buyers—they become important only when distributed asymmetrically among market participants. Symmetrically distributed power should simply cancel out. *Ceteris paribus*, the effect of a few major sellers may be countered by an equally small number of major buyers. At the micro level of pricing and output decisions, the economic relationships between interdependent sellers and buyers have been treated by various bilateral monopoly and oligopoly models, although a well articulated theory of bilateral monopoly and oligopoly is still pending.

It can be safely argued, however, that the degree of bargaining power commanded by firms within an industry influences the costs of dealing with suppliers and customers. Greater relative power allows firms to diminish the transaction costs associated with contracting, recontracting, and policing against possible opportunism (Williamson, 1975), as well as securing favorable contract arrangements with suppliers of inputs and purchasers of outputs. When power advantages are exploited, management of resource interdependence and reduction of uncertainty regarding suppliers and customers could likely be better achieved by favorable long term contractual arrangements than by vertical mergers. Blois (1972) appropriately labels this phenomenon of asymmetries in power distributions "vertical quasi-integration." Quasi-integration may be defined simply as a firm's ability to obtain the benefits of vertical integration without the potential costs associated with the physical extension of operations into adjacent phases of the production chain (Harrigan, 1983; Porter, 1980).

As a case in point, the public investigation into the Rolls Royce bankruptcy of 1969 revealed several circumstances in which Rolls Royce was able to gain advantages because of its position as the dominant customer for a number of smaller firms. Rolls Royce represented an essential portion of total sales for many suppliers. Also, the products of many of these suppliers were specific to Rolls Royce's operations, and they were not easily transferable to other markets and technologies. Blois (1972) reported that the official receiver in the Rolls Royce bankruptcy case found unusually large levels of credit extended to Rolls Royce by some of its suppliers, whereas a minor customer with less power would likely have been given normal credit terms. Perrow (1970) reported a similar situation in which large automobile manufacturers were able to audit the inventory and sales records of smaller suppliers, an unusual activity that firms enjoying more power certainly would have prohibited. Both of these examples are consistent with the thesis maintained here: when quasi-integration conditions are evident, absorption strategies are unnecessary and perhaps even counterproductive for the advantaged firm.

Hypothesis

The hypothesis follows from the argument that firms enjoying a strong relative power base can manage their resource interdependencies through market exchanges, that is, through vertical quasi-integration, thus releasing resources for other forms of diversification activity, such as conglomerate and nonmarket related extension strategies. The higher costs of organizing conglomerate mergers is balanced by the lower cost of managing resources in the firm's primary market, while providing a hedge against technological surprises. Also, mergers along nonmarket links, though not providing the hedging advantages of conglomerate mergers, allow for the release of synergy along technological links and effectively utilize resources not needed for absorption strategies of managing resource interdependence.

In juxtaposition, firms suffering from relative power disadvantages may find that the market alternative for managing resource interdependence entails higher market related costs than the costs of managing these resources internally. For these firms, however, two possible in-house strategies exist. The first strategy is simply vertical integration into the adjacent supplier and buyer markets that the firm desires to control physically. The second strategy entails expanding the firm's power base relative to suppliers and customers, thus decreasing the costs of achieving a market solution to managing resource interdependence. This strategy parallels Galbraith's (1952) thesis of countervailing power, in which countervailing power is defined as the "self-generating" force to balance seller power by the emergence of concentrated groups of suppliers and customers. Relative power can be heightened by increasing the concentration of an industry vis-à-vis suppliers and buyers. It therefore follows that horizontal or market expansion mergers, which facilitate incremental increases in countervailing power by reducing the number of parallel competitors, may also be an appropriate strategy for managing resource interdependence under certain conditions. Formally then,

H1: High relative power encourages conglomerate mergers and/or mergers along nonmarket links; low relative power encourages mergers of vertical integration and/or strategies of horizontal and market expansion mergers.

There are obvious advantages and disadvantages attached to each of the available strategies. Although vertical integration provides an immediate solution to the resource interdependence problem for firms suffering from low relative power, the cost of organizing upstream or downstream markets internally may be substantial. These organizing costs arise from the increased internal coordination and integration of marginally related product-markets. Interdependence does not equate to synergy potential. Production, marketing, distribution, product development, and other activities may be substantially different between different firms even though their products or services are interdependent with each other. On the other hand, horizontal and market expansion mergers, although cheaper to organize internally

because of the high degree of synergy between acquiring and acquired firms, provide only indirect relief from resource dependency problems. Their effectiveness is dependent on the explicit or implicit cooperation of market participants to counter the power held by suppliers and customers.

Variables

Concentration and Power

Although many indices of economic power have been suggested in the literature, the most common variant is *N*-firm seller concentration (SCR) as measured by the percentage of an industry's output originating in the leading *N* firms in that industry. Seller concentration ratios of 4, 8, 20, and 50 firms are reported in the Census of Manufactures for each manufacturing industry specified by a 4-digit Standard Industrial Classification (SIC) code, though the four firm figures are most widely used for research purposes. Although the 4-digit SIC industry breakdown provides precise data for product groups, there are two major problems with using these data for merger research. First, merger data as reported by the Federal Trade Commission are based on broader industry definitions, sometimes at the 2-digit level. Identifying an acquiring or acquired firm's primary business activity by a single narrow 4-digit product designation makes little sense; the majority of large firms are sufficiently diversified to sell products across a number of these narrow product definitions (Federal Trade Commission, 1972). Second, discussions of economic power must consider the degree of substitutability of products (Porter, 1980). Alternative sources of supply, or substitutable products, dilute the effect of power that firms might have in an industry: buyers, if squeezed too severely, will seek out alternative inputs if available. Products defined at 4-digit SIC levels show a higher degree of substitutability than products defined at broader levels. For these reasons, plus the desire here to employ the same level of data as Pfeffer's (1972) earlier study on organizational interdependence, economic power is defined utilizing the broader 2-digit industry classifications. There are clear advantages in using the 2-digit classification for merger data. It is recognized, however, that the full impact of economic power relationships may occur at a more disaggregate level and possibly is measured most effectively at the strategic business unit (SBU) level as defined in the profit impact of market strategies (PIMS) program (Galbraith & Stiles, 1983).

Weiss (1963) has suggested employing a sales weighted average seller concentration ratio (ASCR) for data aggregated at industry classifications broader than the 4-digit level. Weiss calculated ASCRs for 2-digit industries by weighting the 4-firm ratio of a particular product (4-digit SIC) by that classification's percentage of total shipments (2-digit SIC). Thus,

$$ASCR_i = \sum_{j=1}^n S_j / S_i(SCR_j) \quad (1)$$

where S_i = value of shipments in the i th 4-digit product classification,
 S_t = value of total shipments in the t th 2-digit industry,
 SCR_i = four firm seller concentration ratio (4-digit SIC), and
 n = number of 4-digit product classifications in the t th 2-digit industry.

Weiss concluded that although the ASCR is "undeniably rough, it hardly is unique among economic indicators in this respect. Its faults seem sufficiently mild to permit its use in the analysis of a great deal of information available only on a basis too aggregative for the use of customary concentration measures" (1963, p. 252).

ASCR measures the degree of seller power, and buyer concentration ratios (BCR) provide a corresponding index for buyer power. As previously discussed, the bilateral market relationships between seller and buyer must be made explicit when considering the power relationships. The potential effects of high seller concentration may be negated through the countervailing power of high buyer concentration. Unlike SCR, however, BCRs are not published, but they can be inferred from input-output (I-O) tables if one assumes that produced factor input/output ratios are identical for all firms.

Lustgarten (1975) suggested a sales-weighted average of all consuming industries, with the weights derived from the I-O tables:

$$LBCR_i = \sum_{j=1}^n X_{ij}/S_i(SCR4_j) \quad (2)$$

where n = number of consuming industries,
 X_{ij} = sales of producing industry i to consuming industry j ,
 S_i = total sales of industry i , and
 $SCR4_j$ = 4-firm seller concentration ratio of consuming industry j .

This calculation produces, as Guth, Schwartz, and Whitcomb (1976) note, a $4n$ -firm BCR rather than a 4-firm BCR. They suggested an alternative estimate of BCR "by ranking consuming industries by value of concentrated purchases $X_{ij}(SCR4_j)$, and selecting the top m totals" (1976, p. 489). The $4m$ -firm BCR is:

$$BCR(4m)_i = \sum_{j=1}^m X_{ij}/S_i(SCR4_j) \quad (3)$$

Thus values of m equal to 1 would produce 4-firm BCRs, m equal to 2 gives 8-firm BCRs, and so on. Because ASCR may overstate true SCR for the same reason Guth et al. (1976) argued against Lustgarten's calculations, it was felt that BCR as computed by $BCR(4m)$ would be the appropriate measure so as not to compound bias problems. In addition, Lustgarten's method requires SCRs for all consuming industries. SCRs, however,

are reported only for manufacturing industries, and must therefore be estimated for other consumers such as government, services, retailing, and households, whereas $BCR(4m)$ requires SCRs for only the top m consuming industries.

To compute buyer concentration ratios, the 1958 input-output data compiled by the U.S. Department of Commerce (1965) and summarized in Leontief (1966) were used. It should be noted that the 1947 input-output data (which were used in Pfeffer's 1972 study) produced the same results. The input-output relationships can be specified at the 2-digit SIC level to conform with the ASCRs presented in Table 1. Because many of the producing industries were also major consumers—for example, auto manufacturers purchasing autos— m equal to three was selected. This allows for measurement of buyer concentration combining the effect of one industry's purchases with other purchasing industries, yet does not seriously bias the estimate upwards. Average buyer concentration ratios therefore are estimated as:

$$ABCR_i = X_{i1}/S_i(ASCR_1) + X_{i2}/S_i(ASCR_2) + X_{i3}/S_i(ASCR_3) \quad (4)$$

where the three industries selected for weighting are those that result in the top three values computed from $X_{ij}(ASCR_j)$.

An industry was excluded from the analysis if sales to households, retail, or government exceeded 25 percent of total output, thus effectively eliminating the need to estimate concentration ratios along noncomparable dimensions. The inclusion criteria were satisfied by 11 industries: textiles, lumber, pulp and paper, chemicals, petroleum and coal, rubber, stone (clay and glass), primary metals, fabricated metals, nonelectrical machinery, and electrical machinery. ABCR values for these industries are shown in Table 1. To obtain a measure of the degree of power that sellers have with respect

Table 1
Relative Power by 2-Digit SIC Industry

SIC Code 2-Digit	Industry	Average Seller Concentration Ratio (ASCR) ^a	Average Buyer Concentration Ratio (ABCR) ^b	Power Ratio (POW)	Power Classification ^c
22-23 ^d	Textiles	24.7	15.2	1.6	Low
24	Lumber	10.6	5.8	1.8	Low
26	Pulp and paper	21.9	11.7	1.9	Low
28	Chemicals	43.4	14.4	3.0	High
29	Petroleum and coal	34.9	14.9	2.3	Low
30	Rubber	55.2	9.5	5.8	High
32	Stone, clay, and glass	42.0	7.6	5.5	High
33	Primary metals	49.8	24.6	2.0	Low
34	Fabricated metals	27.2	9.8	2.8	High
35	Non-electrical machinery	31.8	9.0	3.5	High
36	Electrical machinery	48.0	10.7	4.5	High

^aFrom Weiss (1963).

^bFrom 1958 input-output tables (U.S. Department of Commerce, 1965; Leontief, 1966).

^cIndustries were classified as having low relative power if POW was less than 2.5.

^dExcluding SIC 225.

to buyers, the ASCR for each industry was divided by its corresponding ABCR. High power (POW) ratios reflect asymmetric seller advantages when dealing with immediate customers.

Merger Data

Merger data were obtained from the Federal Trade Commission (FTC) (1972) list of large acquisitions (assets larger than \$10 million), 1948-1972. Acquisitions for the years 1956-1960 were selected to correspond to the POW figures. In all, 1976 mergers were identified in which the acquiring firm fell within one of the 11 industries. This represented 72.7 percent of all large acquisitions during this time frame.

Each merger is classified by the FTC according to the primary strategic relationship between the acquiring and acquired firm. Five primary merger strategies are identified: (1) *Horizontal* mergers involve firms that produce one or more of the same, or closely related, products in the same geographical area; (2) *Vertical* mergers occur when the two firms have a buyer-seller relationship prior to the merger; (3) *Product extension* involves firms that are functionally related by product, but serve noncompeting markets. Product extension strategies can be considered synergistic along technology links; (4) *Market extension* occurs when the merging firms sell the same or similar products in different geographical areas; (5) *Conglomerate* mergers are between firms that have dissimilar products and markets.

Whenever a product extension merger was identified by the FTC, yet the two firms showed the same 3-digit SIC industry code, it was noted as a possible misclassification. Similar 3-digit SIC codes may represent either market extension or horizontal mergers in reality. A summary of merger data is presented in Table 2.

Table 2
Type of Merger Strategy

Industries	Merger Type				
	Horizontal	Market Extension	Vertical Integration	Product Extension	Conglomerate
<i>Low power</i>					
Petroleum and coal	10	2	4	1	0
Pulp and paper products	8	4	6	6 (3) ^a	3
Primary metals	6	0	6	10 (5)	1
Lumber	2	2	2	0	0
Textiles	4	0	1	8	5
Total	30	8	19	25 (8)	9
<i>High power</i>					
Chemicals	2	2	5	9 (4)	2
Rubber	0	0	0	1	2
Stone, clay, and glass	1	6	2	3	0
Non-electrical machinery	1	0	2	12 (3)	3
Electrical machinery	1	0	0	15 (4)	4
Fabricated metals	2	0	0	8	2
Total	7	8	9	48 (11)	13

^aParentheses show the number of mergers that occurred between firms showing the same 3-digit SIC code. These mergers may actually indicate horizontal and/or market expansion strategies.

Analysis

Hypothesis 1 was examined by means of a 2 by 2 contingency table, with the two dimensions defined by strategy type and relative power. If the merger constituted a horizontal strategy, a market extension strategy, or a vertical integration strategy, it was recorded as a Type I strategy. If the merger was classified as either a nonmarket extension strategy or a conglomerate strategy it was designated a Type II strategy. Relative power was divided into either "high" or "low" depending on the POW values. Because of the aggregate nature of indices, the averaging process for obtaining ASCRs, and the potential bias problems of ABCR, it was deemed more appropriate to assume less demanding nonparametric characteristics for the power data. Industries having POW values less than 2.5 thus were classified as holding low power positions; POW values greater than 2.5 resulted in a high power position classification.

If Hypothesis 1 holds, one would expect to find a greater frequency of Type II mergers for industries in high power positions; Type I mergers should dominate industries with a low power position classification. The results of the analysis are displayed in Table 3, using the FTC estimate of merger type, and in Table 4 when product-extension merger into the same 3-digit SIC industry is reclassified as a Type I merger. Table 3 shows 24 Type I mergers and 61 Type II mergers in industries enjoying strong power positions. Industries with lower power positions, however, experienced only 34 Type II mergers, but had 57 Type I mergers. With an $X^2 = 19.57$, it can be concluded that there is a significant relationship (at the 1 percent level) between relative power and type of merger.

Table 3
Merger Type \times Relative Power Table
FTC Classification

Merger Type	Relative Power Position	
	Low	High
I	57	24
II	34	61

$X^2 = 19.57^*$

* $p < .01$

Table 4
Merger Type \times Relative Power Table
Reclassification

Merger Type	Relative Power Position	
	Low	High
I	65	35
II	26	50

$X^2 = 15.18^*$

* $p < .01$

Table 4, which allows for misclassification by the FTC, also supports the hypothesis. With these adjustments, 35 Type I and 50 Type II mergers are recorded for high-power cells versus 65 Type I and 26 Type II mergers for industries suffering low power positions. This association is also significant at the one percent level.

Conclusion

The study considers relative market power as one determinant of merger behavior. It is argued that power is not unitary, but resides in the bilateral dependencies between buyer and seller. If merger is considered a strategic response to organization and resource interdependence, as Pfeffer and Salancik (1978) suggest, the importance of relative power in framing merger alternatives must be considered. It is suggested that managing one's resource environment can take two basic economic forms, a market exchange solution or an organizational solution, and that firms enjoying advantages in relative power may find a market solution more attractive and less costly by enforcing quasi-integration. This releases resources for merger strategies not designed for resource management. However, firms in weaker relative power positions are more likely to control their resource environment through either physical absorption by means of vertical integration or expansion strategies in line with Galbraith's countervailing power thesis.

Using a variety of data sources, it was shown that there exists a statistically significant relationship between type of merger strategy and relative power. Because of the relatively small number of industries examined and the aggregation problems associated with measuring bilateral power, the findings in this study must be considered exploratory in nature.

The results nonetheless are intriguing. The findings clearly support Pfeffer and Salancik's (1978) perspective of examining organizational strategies from a resource dependence perspective, yet fit nicely into the institutional economic framework of Williamson (1975) and Porter's (1980) notion of extended rivalry. In particular, the results fill the empirical gap between relative power considerations and resource/market management discussed by these authors. The conclusion remains that strategists need to consider not only the growth and profitability of markets when making diversification decisions, but also the degree to which extension into these markets will alleviate problems associated with relative power and resource dependency.

Further considerations of merger activity, resource interdependence, and power should be explored on a larger scale, perhaps with a more detailed definition of industry classification, broader definitions of power factors beyond market conditions, and the inclusion of additional factors such as entry barriers. The task remains to expand the concept of bargaining power beyond its present contribution and to consider its role in influencing the total range of corporate strategy.

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Environment, Strategy, and the Implementation of Administrative Change: The Case of Civil Service Reform¹

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A comparative study was done on implementing innovations by an entrepreneurial-generalist and an efficiency-based specialist organization. In the generalist organization administrative innovation was sought by top management to improve coordination, but was difficult to achieve. In the specialist organization, administrative innovation was more easily achieved, but was less sought after.

In a recent review of the literature on organizational innovation, Daft (1982) points out that a major research interest has been "the notion of how and why changes are brought into and implemented within an organization" (p. 131). He goes on to argue, however, that "only a few studies have probed into [the] underlying processes [of innovation] or organized general models of innovation" (p. 133). Three questions in particular stand out. First, to what extent are models based on a variety of different kinds of innovation (developing a new product or market, using a new vaccine) applicable to any particular innovation? Second, what effects do the makeup and intentions of the adopting organization have in facilitating or impeding use of the innovation? Third, does the phrase "the adopting organization" mask systematic difference among parts of the organization in reacting to innovations? This paper begins to develop tentative answers to these

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questions by exploring the implementation of personnel reforms in the federal government, drawing on both the innovation literature and recent work on organizational strategy.

Daft (1978, 1982) has drawn attention to the difference between technical and administrative innovations, noting that the two are fostered in different structures and have different processual features. Administrative innovations are ones relating to the management of work processes (goals, policies, incentives, coordination, and control); technical innovations relate to the work process itself. Daft (1978) found that technical innovations generally are produced by technical personnel. Administrative innovations tend to be proposed by higher level administrative personnel. To explain these results Daft proposed a dual core model of organizations, as opposed to the single technical core posited by Thompson (1967). Drawing on Burns and Stalker's (1961) distinction between organic and mechanistic organizations, Daft found:

In organic organizations, the frequency of technical innovation was high, but the frequency of administrative innovation was low. The freedom that encouraged technical innovation also made it hard for administrators to impose administrative innovations onto the technical personnel (1982, p. 138).

He argues that administrative and technical innovations are produced and adopted differently and for different reasons. In particular, technical innovation is influenced more heavily by environmental factors (uncertainty in supply and product markets, and scientific and technical knowledge), but administrative innovation is more responsive to internal needs for coordination, structuring, and direction.

Much empirical support is found for the association between technical innovativeness and organic structure (see Hage & Dewar, 1973, for a review), and some support has been advanced for the administrative innovativeness of relatively mechanistic organizations (Daft, 1982; Daft & Becker, 1978; Kimberly & Evanisko, 1981). Certainly, one implication of this research is that there are at least two different classes of innovations, having characteristically different proponents, audiences, and outcomes.

Daft also begins to address the second question by exploring the organizational features associated with different types of innovation decisions. This association is made more explicit by drawing on a recent article by Brittain and Freeman (1980). These authors posit several strategic positions that organizations assume or evolve, and they link these positions to innovation activity. The two strategic types of interest here are the entrepreneurial generalist and the efficiency-based specialist. Similar to prospector organizations identified by Miles and Snow (1978), the entrepreneurial generalist organization is likely actively to seek out new opportunities that are only tangentially related to its existing activities. Such strategies are found more often in environments that are supportive and in which competition is scarce. Because competition is not a problem, efficient use of available resources usually is not as important as technical innovation, adaptability, and speed. Entrepreneurial generalist organizations are likely to employ a workforce

that possesses a wide range of general skills, thus increasing the organization's adaptability. These organizations usually are loosely coupled (Weick, 1979), decentralized, and otherwise rather organic in character.

The efficiency-based specialist organization, like the defender in Miles and Snow (1978), is relatively unlikely to seek out new activities. These organizations tend to appear in less supportive, more competitive environments, in which successful operations require a high level of efficiency in resource utilization. These organizations tend to be relatively mechanistic, with a specialized skill and technology mix and a centralized and functionally organized structure.

Brittain and Freeman (1980) argue that entrepreneurial generalist organizations also tend to be more technically innovative than efficiency-based specialists, largely because of strategic decisions to pursue and locate new market niches, and because of the uncertainty and instability of the market niches they occupy. The relatively stable environments of specialist organizations discourage innovation, and the low levels of support in their environments discourage expending resources on innovation.

Table 1 organizes and extends the foregoing discussion and presents two related clusters of variables. One cluster, labelled organizational context, describes the two positioning strategies and related contextual features, hypothesizing that entrepreneurial generalist organizations will tend to flourish in supportive environments with sparse competition and will tend to have organic structures. By contrast, efficiency-based specialist organizations will tend to be found in competitive environments and will tend to have more mechanistic structures.

Table 1
Strategic Position, Organizational Context, and
Hypothesized Relations to the Process of Administrative Innovation

	<i>Strategic Position</i>	
	<i>Entrepreneurial Generalist</i>	<i>Efficiency-Based Specialist</i>
<i>Organizational Context</i>		
1. Mission	Broad	Narrow
2. Environmental support	Munificent	Sparse
3. Competition	Weak	Strong
4. Structure	Organic	Mechanistic
<i>Hypothesized Innovation Process for Administrative Innovations</i>		
1. Key administrative problems	Coordination	Efficiency
2. Policy-level reaction to administrative innovation	Supportive	Indifferent
3. Operations-level resistance to administrative innovation	Strong	Weak
4. Operations-level reaction to administrative innovation	Negative	Indifferent

The third question concerns systematic differences among organizational segments in response to innovation. The administrative and technical cores posited by Daft (1978) are likely to have very different concerns, and the natures of these concerns will vary by positioning strategy, as depicted in the bottom panel of Table 1. The administrative problems likely to be found

in the entrepreneurial generalist organization will center around means of coordinating and integrating a set of diverse and relatively autonomous activities. The prevalence of such control problems in organic organizations is well known (Chandler, 1977; Galbraith, 1974; Greiner, 1972; Lawrence & Lorsch, 1967). The administrative problems faced by specialist organizations are more likely to focus on efficiently providing a limited range of products or services, "doing more with less." By implication, the administrative core of entrepreneurial generalist organizations is likely to respond warmly to innovations promising increased coordination. Responding to the same innovation, administrators in efficiency-based specialist organizations are likely to be less enthusiastic, because this kind of innovation does not address their most pressing problems.

Extending the argument to the reactions of operations-level personnel is likely to produce paradoxical results. Drawing on Daft (1978), operations-level personnel are likely to be loosely governed, flexible, and expansive in entrepreneurial organizations, and they are likely to resist any encroachments on their autonomy (also see Miles and Snow, 1978). They will be more closely constrained in specialist organizations in which innovation is less valued. Lacking autonomy, operations-level personnel will be less able or likely to resist administrative coordination.

Combining these remarks with the earlier discussion on the administrative reactions to innovation leads one to expect that administrative innovations promising coordination are likely to be seized on by administrators in entrepreneurial generalist organizations and resisted by their operations-level personnel. The same innovation likely will be ignored or implemented pro forma by administrators in specialist organizations, and operations-level personnel likely will share their lack of enthusiasm and concern.

The role of positioning strategy in administrative innovation is expected to be paradoxical. The implicit logic of the entrepreneurial generalist strategy, emphasizing loose coupling and decentralization, does not directly favor administrative innovation—quite the contrary. However, the complexity and diversity of entrepreneurial organizations create administrative problems in managing the organization, leading managers to seek administrative innovation in spite of active and potent resistance from operations-level personnel. Administrative innovations are desired not because of strategy, but because of how strategy manifests itself within the organization.

Two case studies will be developed in which the administrative and operations-level responses to an innovation are linked to the more general positioning strategies of two federal agencies. To be sure, these positioning strategies are closely related to the respective organizations' missions, environments, and organizational structures. The focus, however, will be less on the relations among dimensions within these clusters and more on the pattern of administrative and operations-level postures and reactions relating to innovation.

Data and Methods

The Civil Service Reform Act of 1978 and its subsequent implementation in federal agencies represents a good test of the foregoing argument. The act represents the first major reform of federal personnel practices since the Pendleton Act of 1883. Chief among the provisions of the Reform Act are the promulgation of annual performance contracts including written performance standards for senior and middle-level managers, with raises and bonuses tied to rated performance against the standards.

The reforms were designed to allow substantial latitude to federal agencies in questions of how performance contracts are constructed, appraisals carried out, and in how compensation is linked to rated performance (Office of Personnel Management, 1981). Training for activities mandated by the act, as well as integration of performance standards and appraisal with existing administrative planning and control mechanisms, also were left to the agencies' discretion.

The research underlying this paper is part of a five-year evaluation of the effects of civil service reform conducted in five sites of two federal agencies, the Environmental Protection Agency (EPA) and the Mine Safety and Health Administration (MSHA). This paper draws most heavily from data collected in the headquarters sites of the two agencies between February 1980 and March 1981.

The data reported in this paper encompass three of the four methodologies identified by Snow and Hambrick (1980). First, published accounts of the workings of both agencies (Environmental Protection Agency, 1980; Marcus, 1980; Mine Safety and Health Administration, 1980; National Academy of Sciences, 1977; Quarles, 1976), records of congressional hearings, internal agency memoranda, and plans and evaluations provide external assessments or objective indicators in Snow and Hambrick (1980).

Second, investigators' inference is aided by formal and informal interviews with more than 200 officials, managers, and employees of the agencies from 1980 to the present. Among those interviewed were the chief administrative officers of the two agencies, members of their staffs responsible for implementing the reforms, and a sample of operations-level managers.

Finally, the paper draws on questionnaires distributed to employees in MSHA in the summer of 1980 and in EPA in March 1981. In MSHA's headquarters, questionnaires were sent to all employees, of which 87 percent were returned. This paper relies primarily on the 87 questionnaires returned by employees in General Schedule grades 13 and above, corresponding roughly to middle and upper management. The data from EPA come from a stratified sample of EPA headquarters employees. The return rate of 63 percent yielded 213 questionnaires from management employees.

The data permit a variety of measures for each of the concepts listed in Table 1. Positioning strategy is measured by historical accounts drawn from published materials and interviews, as well as the number of pieces

of enabling legislation governing the agencies' activities. Although this measure might be considered closer to mandate than strategy, agencies can affect their legislative base substantially (McCaffrey, 1982). Environmental support and competition are assessed qualitatively. Agency structure is measured by the historical fluidity of the two organizations' structures, the education and specialization of their respective labor forces, and the distribution of influence in the organization. The second cluster of variables, relating to the innovation process, has several components. Administrators' interpretations of key agency problems are assessed through interview responses to direct questions. Administrative reactions to the innovation (the Reform Act) are measured by interview responses and concomitant actions. Operations-level resistance to administrative innovations is assessed by measures of trust in agency administration, agreement on agency mission, and attitudes toward administrative innovation generally, all measured by questionnaires. Finally, operations-level reaction to the reforms is measured through questionnaire responses and by activities in opposition to the implementation of the reforms.

Caveats to the current study are in order. The narrative of this study is carried through early 1981. Shortly following the Reagan election, however, changes in the strategies and missions of both these agencies were begun. Further, because these changes in leadership had widespread implications for these two agencies (Gaertner, Gaertner, & Devine, 1983) presenting more recent data would be misleading. Thus, the analysis is comparative but post hoc, rather than representing a quasi-experimental design.

Results

In many respects EPA and MSHA are rather similar. They are both executive branch regulatory agencies, the missions of which include the regulation of private sector enterprises. Moreover, both are bound by enabling legislation which is rather specific, frequently mandating certain regulatory activities to be accomplished by certain dates, and both utilize scientific, legal, and economic technologies in the creation and enforcement of regulations (Wilson, 1980). Finally, the two agencies were presented with an identical stimulus—the Civil Service Reform Act of 1978—and both agencies had substantial flexibility in how they would respond to the reforms.

Despite their surface similarities, it is the patterned differences between the two agencies that form the basis of the analysis. Profiles of the two agencies establish that EPA exemplifies an entrepreneurial generalist organization and MSHA is accurately characterized as an efficiency-based specialist.

Positioning Strategy and Mission in Two Agencies

Evidence of both past history and current intention tends to support the characterization of EPA as having an entrepreneurial generalist strategy and of MSHA as an efficiency-based specialist.

Although early accounts of EPA by contemporaries make no explicit mention of strategy, they leave little doubt of the early ambience of the agency and its leadership. Quarles refers to the agency as "sparkling with vitality" (1976, p. 34), as "a new agency, an exciting issue... [with] bold positions" (1976, p. 25), and as responding "to the pressures of the grassroots political protest in all the decisions and actions initiated by Bill Ruckelshaus as [the agency's first, and current] Administrator" (1976, p. 36). Ruckelshaus "did not seek support for his actions in the established structures of political power. He turned instead directly to the press and to public opinion, often in conflict with those very structures" (1976, p. 36). The steady march of enabling legislation extending the range of EPA's activities indicates the agency's entrepreneurial strategy as well. Seven major pieces of legislation extending EPA's mission were passed between 1970 and 1980. An examination of EPA's activities with respect to the most recent legislation, dubbed "Superfund," shows that the agency acted to facilitate its passage by writing much of the bill, helping to marshal press and public support (Magnuson, 1980), and testifying in support of the bill in Congress (Congressional Record, 1980). Importantly, none of these activities was forced by existing law, and only indirectly, if at all, by the existing mission of the agency. The implication is that it is not simply the nature of EPA's mission that leads to its entrepreneurial stance, but rather mission combined with the operation of an active expansive strategy.

For MSHA, mission and environment constrain the agency to strategies that are intensive rather than extensive. As one agency officer put it, "We get only subtle shifts from administration to administration. The people who run this place stay. The things that we do, by and large, are the same." The main goals of the agency are to enforce the law, reduce mine deaths and injuries, and educate and train miners and mine operators in safe mining practices. These have been the agency's goals for some time, and there is no apparent urgency in encouraging new legislation. That new legislation in mine safety generally follows mine disasters is evidence of the agency's basically reactive stance in promoting new legislation.

Environmental Support and Competition

EPA's mission has received broad-based support in public opinion since the early 1970s; and, despite recent declines, support for environmental regulation remains substantial in most opinion polls (Lipset & Schneider, 1983). The sheer breadth of EPA's mandate encompassing air, water, noise, chemical and organic waste, radiation, and pesticides and other toxic materials ensures a wide range of constituencies whose interests are potentially affected by environmental regulation.

MSHA is less well situated on these counts. Support for and opposition to mine safety regulation generally is confined to narrow occupational and organizational groupings. Mine safety legislation and support for MSHA's activity are responsive mainly to major disasters. Day-to-day mining

activity is geographically and occupationally sufficiently local that it commands little widespread attention (Erikson, 1976).

In terms of competition, MSHA faces formidable obstacles in broadening its mission, but EPA is in a near monopoly position supporting measures and regulations to protect the environment. The Bureau of Mines, of which MSHA was once a part, the Office of Surface Mining, and the Occupational Safety and Health Administration have missions broadly similar to MSHA's, but no other agency has a mission similar to EPA's. Partly, this is a matter of design, because EPA was formed to unify the multiple and sometimes conflicting agencies all addressing environmental regulations (Quarles, 1976). These differences are summarized in Table 2.

Table 2
Summary of Qualitative Data Regarding Agency Differences in Organizational Context^a

	<i>EPA (Entrepreneurial Generalist)</i>	<i>MSHA (Efficiency-Based Specialist)</i>
1. <i>Mission</i>		
Number of pieces of current major enabling legislation	7	1
2. <i>Environmental support</i>		
Program areas	many	few
National interest in program	widespread	narrow
Sources of new legislation	internal proactive	external reactive
3. <i>Competition</i>		
Number of other agencies operating in niche	0	3

^aData comparing agency structures are presented in Table 3.

Thus, for MSHA, opportunities for expansion of service into related areas are constrained by other agencies that could or may already provide that service. By contrast, for EPA, collaboration or competition in issue domains is intraagency rather than interagency. This tends to make the internal organizational politics of EPA more active.

Organizational Structure

The structures of the two agencies reflect their respective strategies, missions, and environments. Comparisons of their organizational structures also give the clearest contrasts of their priorities. EPA's organizational structure is complex and fluid, shifting with the tides of legislation and administration. In 1976, EPA was composed of five major offices each headed by an assistant administrator. Two of these offices (the "program" offices) were responsible for the types of pollution indicated by their names—Air and Waste Management, and Water and Hazardous Materials. Three offices represented support functions—the offices of Planning and Management, Research and Development, and Enforcement. In 1977 an Office of Toxic Substances was added, with Pesticides moving to join it; hazardous

waste management was moved to join the Office of Water and Hazardous Materials; and noise and radiation programs were added to the Office of Air programs. More recently, an Office of Solid Waste and Emergency Response (including the peripatetic hazardous waste program) was created. By contrast, MSHA's structure has remained relatively constant. It is headed by an Assistant Secretary of Labor. The agency has two main offices—Coal Mine Safety and Health, and Metal/Non-metal (non-coal) Safety and Health—and five subordinate offices or directorates. This basic structure has been in place since MSHA moved to the Department of Labor in 1978.

Table 3
Agency Differences in Structure

	EPA	MSHA
<i>Distribution of workforce</i>		
1. Total agency workforce	10,862	3,500
2. Proportion of total agency workforce in headquarters	59.2	8.6
<i>Flexibility of workforce</i>		
3. Proportion of headquarters workforce in:		
a. Research and development	26.7	5.6
b. Enforcement	6.9	43.2
4. Proportion of agency employees in administrative units	15.1	3.2
<i>Education of workforce</i>		
5. Education:		
a. Percent managers with Ph.D. level work (headquarters only)	34.8	9.3
b. Percent managers with college degree (headquarters only)	95.0	69.0
<i>Decentralization of decision-making</i>		
6. Rated influence of: ^a		
a. Regional offices	44.0*	31.2
b. Headquarters enforcement units	49.3*	80.7
c. Headquarters administrative unit	73.2*	37.4

^aHeadquarters GS 13+ managers were asked: "In many agencies there is a tendency for different groups to have different amounts of influence on policy making in the agency. For each of the following groups please indicate how much influence on policy you think that group has, using the scale below." Response categories included (1) no influence, (2) a little influence, (3) a moderate amount of influence, (4) quite a lot of influence, and (5) total influence. Figures presented are the proportions rating that unit in categories (4) or (5).

*Agency differences statistically significant; $p < .05$

Table 3 shows in some striking ways how EPA's workforce differs from MSHA's. In total labor force, EPA has about three times as many employees as MSHA. EPA's labor force is predominantly in headquarters; MSHA's is mainly in the field offices, reflecting differences in the administrative and operational priorities of the two agencies. EPA's strategy, supported by its mission, has been to concentrate resources in headquarters, planning rather than enforcing environmental policy. This role is supported by another difference between the agencies in the relative strengths of research and development. More than a quarter of EPA headquarters staff is in R&D; about 5 percent of MSHA's headquarters personnel are in the analogous function (Technical Support). As the next item suggests, MSHA's personnel are more likely to be directly involved in enforcement activities. Finally, EPA's administrative component is relatively larger than MSHA's.

These differences in structural emphasis are mirrored in characteristics of the two labor forces. In EPA headquarters, about 35 percent of managers have done Ph.D. level work, compared with only 9 percent of MSHA's managers; EPA managers also are more likely to hold a college degree.

Although MSHA is more decentralized geographically, EPA appears to be more decentralized in terms of decision making. About 44 percent of EPA's headquarters managers thought that regional offices had a "great deal" or "quite a lot" of influence on policy making in the agency; only 31 percent of MSHA's headquarters managers thought the agency's district offices had a similar level of influence.

Thus, though MSHA has a much larger proportion of its total workforce outside headquarters, these units are relatively homogeneous enforcement functions that perform their tasks according to a standardized set of policies and procedures. Further, MSHA's field organization is functionally specialized, with each separate function reporting to headquarters. In EPA's field offices, functions are combined at the regional level and report to a regional administrator.

EPA's administrative unit is rated as considerably more influential than MSHA's. The size and sophistication of this unit reflect the complexity of this organization, one in need of considerable investment in staff support activity to keep the agency operating proactively. In MSHA, the administrative unit does only traditional administrative, personnel, budget, and facilities management activities. The relative lack of influence of the administrative unit in MSHA suggests the overall predominance of enforcement activities in the agency's mission and strategy. Enforcement units were seen to have more influence in MSHA than in EPA.

The evidence suggests that EPA's structure and workforce are more organic (that is, flexible, decentralized, highly educated, and research oriented) than MSHA's. Although EPA's size relative to MSHA's might partly account for its greater complexity, flexibility and decentralization are not generally associated with size per se (Pugh, Hickson, Hinings, & Turner, 1969). Rather, these differences mirror differences in strategy and mission.

Key Administrative Problems

According to one of EPA's high-level administrative officers, "The idea that government needs less management is absurd—government is under-managed." He gave several reasons. First, "the resolution of policy issues in EPA is extraordinarily complex, crossing functional, staff-line and professional-administrative divisions." Second, "creating durable vertical and horizontal links to hold people accountable" is important but difficult. Third, "we need to recognize that senior government managers are unstable, and are chosen for reasons that have little to do with their management values—they aren't likely to ever have been managers before. Nonetheless they are the managers and need to be serviced. The trick is to design a system

which accommodates this, is decentralized and yet maintains accountability." The first and second problems speak generally to coordination and control within the hierarchy; the third speaks to control of the organization overall. Interviews with MSHA's top administrative officers suggest no such concerns about coordination and control. When asked whether the reforms might improve planning and coordination, one agency officer replied, "That isn't much of a problem here. We deal with each other on a day-to-day basis." The same officer said, "If you learn how to ask the right questions, you can learn to solve any problem from a managerial perspective." Generally, informal interaction rather than formal systems were sufficient to deal with problems of coordination.

This informality among top managers is possible for several reasons. First, the mission of this agency is relatively narrow. As a result, its managers tend to come from similar backgrounds, resulting in a commonality of perspective that facilitates informal coordination. Second, the careers of many of MSHA's top managers have intersected at various points so that they also have a history of working together that enhances their ability to interact. Third, because the agency's work is fairly prescribed, it lends itself to standardization of rules and procedures at lower levels.

Table 4
Summary of Qualitative Data Regarding
Key Administrative Problems and Policy-Level Reaction
to Administrative Innovation

	<i>EPA</i>	<i>MSHA</i>
1. <i>Key administrative problems</i>		
Problem solving	coordination	efficiency
Locating accountability	complex	simple
Top career management stability	difficult	easy
Systems required for coordination	low	high
Top career managers' backgrounds	formal	informal
Use of standardized procedures at lower levels	diverse	similar
2. <i>Policy-level reaction to administrative innovation</i>	low	high
Implementation of innovation	supportive	indifferent
View of innovation	accelerated	as mandated
Intended uses of innovation	useful	redundant
	communications	unclear
	control	low disruption
	consensus-building	
Resources devoted to innovation	many	few

Thus, problems for the agency tend to revolve around meeting the mandated numbers of mine inspections with scarce financial and human resources, dealing with the agency's external constituencies in the absence of broad secular support, and trying to prevent loss of resources in executive and legislative budget processes. These differences are summarized in Table 4.

Policy-Level Reactions to Reform

In both agencies top administrative officials were interviewed at length regarding what purposes they had in implementing civil service reform, and what problems they hoped it would help them solve. Relevant memos, training materials, and policy manuals associated with the implementation of the Reform Act were scanned. The substantial unanimity among interviews and between interview and documentary data allows for unequivocal interpretation.

Top administrative officers in EPA warmly endorsed the Reform Act. They testified and lobbied extensively before Congress prior to the bill's passage, and upon passage committed the agency to early and aggressive implementation of the act. They even contributed agency funds to the government-wide evaluation of the act. EPA was one of only eight agencies in government that volunteered to put merit pay in place a year ahead of the mandated implementation date. EPA placed civil service reform as one of the agency's 11 major goals for the 1981 fiscal year, alongside regulatory reform and legislative initiatives. The agency's fiscal year goals noted the use of the reforms as giving "managers practical tools for defining clearly each employee's objectives, evaluating performance and rewarding superior performance" (Environmental Protection Agency, 1980, p. 3). This was part of the broader goal of management reform urging top administrators to "explore alternatives, communicate important choices to senior managers and build consensus" (Environmental Protection Agency, 1980, p. 3). These latter comments should be seen in the broader context of agency problems spoken of above. Agency administrative managers saw the main agency problems as coordination and control of EPA's diverse activities, and they saw the Reform Act as providing tools that would help solve these problems.

Interviews with EPA's administrative officers make this connection more explicit. They saw merit pay and performance standards as one of three major integrative management control systems (alongside zero-based budgeting and internal review-and-concurrence procedures). According to one administrator, these crosscutting mechanisms would, it was hoped, "link professionals with front-line personnel and create linkages across functions, thereby creating accountability and lowering suspicions." He went on to say that "of course, in a different agency I'd do this a different way. In a simpler, less complex agency different controls would be appropriate. We [at EPA] need to structure the resolution of complex policy issues." In terms of reliance on the reforms, integration of the reforms with other management controls, and in sending signals that the innovations were to be taken seriously, EPA's administrative management banked heavily on the Reform Act.

MSHA's reaction was far more sedate. The precise determination of an absence of enthusiasm is rather difficult, but documentary and interview evidence suggest that MSHA's administrators opted for a low-risk/low-gain approach to the reforms. One agency officer pointed out that managers

in MSHA had had a hard time being convinced "that there are any benefits to the new [performance appraisal and merit pay] system. They are not sure performance standards get them what they need. We are not getting any more commitment from our people and we're not getting any more work out of our supervisors." This manager and others consistently evaluated the act on efficiency criteria. Another manager noted that the reforms "were not seen as providing a tool for management." Yet another agency officer admitted that the agency had "no particular enthusiasm for the reforms." Consequently, MSHA's management made few efforts to publicize the reforms as EPA's had, devoted few staff resources to implementation, and made few efforts to integrate performance standards into other agency management systems. MSHA chose to implement the reforms with "as little disruption as possible," not expecting to gain much from them or willing to risk much. When asked whether they saw the reforms as a work planning device, managers replied with bewildered negative responses. Said one official, "Why do we need that? We have MBO."

The last comment may give the impression that the reforms were not, even potentially, a major reform in MSHA, because MSHA already had sophisticated management systems in place. This is not quite the case, however. Management-by-objectives had only recently been put in place, and then in only certain parts of the agency. Moreover, nowhere was this system linked to individual responsibility and appraisal, the main aim of the reform provisions dealt with here. Rather, MSHA's existing management systems were already seen as sufficient for the agency's needs, which were not great. Finally, in EPA, which already had fairly sophisticated tracking systems, the reforms were certainly not seen as redundant. Administrators felt that existing systems were not sufficient to manage the complex, diverse activities of the agency.

Part of the difference in reaction between EPA and MSHA may lie in the differences in the influence of administrative versus program offices in the two agencies. As the data in Table 3 suggest, the influence of the administrative function in EPA would allow EPA, at least initially, to take an aggressive stance toward the reforms. The low influence of MSHA's administrative unit, by contrast, contributed to MSHA's sedate policy level response to the reforms.

Resistance of Operations-Level Personnel to Administrative Coordination

Questionnaire evidence collected in the two agencies suggests a much greater resistance to administrative coordination among EPA's operating level personnel than MSHA's. The first two items in Table 5 suggest this result in general terms—EPA's managers have less confidence in the chain of command than MSHA's and are more likely to distrust agency management.

MSHA's managers also are much more likely to share a view of stability about their organization and consensus about their mission than EPA's managers (items 3, 4, 5, and 6).

Table 5
Agency Differences in Operations-Level Resistance
to Administrative Innovation

	Percent of Headquarters GS 13+ Managers Who Agree or Strongly Agree ^a	
	EPA Headquarters N=213	MSHA Headquarters N=87
1. A good management system is one that uses the chain of command to make things happen.	62.3*	84.7
2. I don't trust management in [the agency] to treat me fairly.	37.6*	9.3
3. In the past few years, how important has loyalty to the mission of the agency been in making promotion decisions (very or all important)?	30.4*	44.1
4. When problems come up in this agency, people in my work unit generally have similar views.	57.9*	72.6
5. In the past few years, how important has who you know been in promotion decisions in the agency (very or all important)?	55.9*	43.9
6. People in this agency are sometimes penalized for their personal political views.	23.3*	4.0
7. Overall, this agency is effective in accomplishing its objectives.	33.1*	83.5
8. The goals of my work unit are almost always met.	81.3	89.6

^aUnless otherwise noted in parentheses following the question wording.

*Agency differences statistically significant; $p < .05$

It was noted that EPA's disputes over mission and direction have tended to be intramural in the past. These disputes over mission in EPA are likely to lead to an internally "political" atmosphere. This attitude is reflected particularly in the differences in items 5 and 6.

One result of EPA's relatively fractious internal environment is shown in items 7 and 8. Only about a third of EPA's top managers agree that the agency is effective at meeting its goals, as compared with more than 80 percent of MSHA's managers. Yet EPA and MSHA managers are nearly equally likely to agree that their own work unit's goals are almost always met. EPA managers' pessimism about agency effectiveness may be attributed not to shortfalls in the delivery of promised services, but rather to honest disagreements about what the agency ought to be doing. Responses to the questions on promotions for "who you know" and perceptions that employees are punished for political beliefs are more closely associated with beliefs about agency effectiveness ($r = -.38$) than are perceptions of work group effectiveness ($r = .21$). Thus, beliefs about agency ineffectiveness seem to stem from the diversity of views represented by the agency rather than actual failures or shortfalls.

By contrast, MSHA's efficiency-based specialism seems to engender more agreement about goals, more reliance on and trust in the hierarchy, and a greater impression of agency effectiveness, if only because there is less disagreement about what the agency ought to be doing.

Operations-Level Reactions to Administrative Innovation

MSHA's sedate policy reaction to the reforms produced no major conflict within the agency, but EPA's aggressive stance was received less warmly by operations-level personnel. The first sign of this reception came when the major program offices of the agency successfully argued that they be excused from early implementation of the act, limiting early implementation to EPA's headquarters administrative office and 3 of 10 regional offices. Results from questionnaires confirm the higher levels of mistrust of the reforms in EPA than MSHA. The questionnaire included 14 items from which positive or negative attitudes toward the reforms could be inferred. As the theoretical discussion above predicted, for 9 of the 14 items the responses of EPA operations-level managers were significantly less positive than were those of MSHA managers, in spite of the more enthusiastic administrative response to the reforms in EPA (one-tailed test, $p < .05$). For the other five items, differences were in the predicted direction, but not statistically significant. Responses to eight items representative of the group are displayed in Table 6.

Table 6
Agency Differences in Operations-Level Reactions
to Administrative Innovation

	<i>Percent of Headquarters GS 13+ Managers Who Agree or Strongly Agree^a</i>	
	<i>EPA Headquarters N=213</i>	<i>MSHA Headquarters N=87</i>
1. Performance appraisal of supervisors and managers based on written performance standards (somewhat or strongly favor).	63.9	66.2
2. Merit pay for supervisors and managers (somewhat or strongly favor).	48.6	57.4
3. There won't be any real change in the way people are paid under merit pay (disagree or strongly disagree).	61.4*	38.4
4. My job is so uncertain and changing that performance standards aren't much good for me.	45.2*	23.9
5. All in all, I think my job should be classified as merit pay.	46.9*	62.8
6. Merit pay will mean the average person will get less money than they would have under the old system.	61.6*	28.8
7. With written performance standards I worry that we will focus too much on quantity and not enough on the quality of the work done here.	56.4*	34.4
8. How merit pay is being implemented in [this agency] is not clear to me.	53.4*	26.6

^aUnless otherwise noted in parentheses following the question wording.

*Agency differences statistically significant; $p < .05$

Although the two sets of managers show few large differences in favorability to the provisions of the act in the abstract (items 1 and 2), major differences begin to emerge in more specific attitudes. EPA and MSHA headquarters managers are equally likely to agree that there will be no change

in how managers will be paid (not shown), but EPA managers are far more likely to disagree (item 3). EPA managers also are more likely to think that their jobs are too uncertain to be covered by standards and are far less likely to think that they ought to be included in the merit pay group. They are much more likely to feel that the average person will be paid less under the new system, and they worry that quantity rather than quality of work will be emphasized. Finally, in spite of voluminous documentation and a trial run of the system, EPA managers are much more likely than MSHA managers to think that the agency's implementation plan is unclear. Part of the reason for this may be that lack of clarity is correlated with distrust of agency management (item 2, Table 5; $r = .25$). In a pilot questionnaire distributed to EPA managers in June of 1980, the most frequently mentioned factor expected to contribute to the failure of the new system was "politics inside EPA," mentioned by nearly 72 percent of those responding. The aggressive strategy of the implementation planners played directly into this active fear of agency managers.

One might argue that EPA's negative reaction to the reforms was a function of its inexperience with administrative systems such as performance appraisal, because of its age. In fact, EPA had more experience with such systems than MSHA at the time these innovations were implemented. The differences are consistent with the foregoing arguments. EPA managers saw more change from the innovations because they were implemented more aggressively (there was more change to see). EPA managers felt that their jobs were too uncertain for performance standards because they probably were more uncertain than were the jobs of MSHA managers. Finally, operations-level employees in EPA worked in a culture that reinforced their autonomy, so they were more distrustful of innovations that might reduce that autonomy than were MSHA employees.

Discussion and Conclusions

Three questions were posed regarding innovation theory and research. The first addressed the generalizability of models of innovation from one type of change to another. Here the authors built primarily on the insights of Daft (1978, 1982) contrasting administrative and technical innovation. The second question dealt with how the nature of the adopting organization was related to innovation decisions, and it was found that positioning strategy and contextual features in the organization condition both innovation and resistance. The third question related to systematic intraorganizational differences in responding to innovation, and here were found contradictory reactions between administrators and operations-level personnel depending on the organization's strategic position.

Thanks to a munificent environment, rich and extensive in public support, and a general mandate to pursue new activities in a relatively uncompetitive field, EPA's strategy is an entrepreneurial one. As a result, EPA administrators felt that the agency suffered from difficulties coordinating

its varied activities, and they interpreted the Reform Act as a mechanism for coordination and control. This strategy, however, was perched precariously atop an agency characterized by subunits with histories and views not particularly amenable to this sort of coordination.

MSHA's lean base of public support and relatively competitive environment inclined it toward an efficiency-based specialist strategy. In this context, major problems were interpreted as the efficient use of available resources across a limited range of activities. Top planners at MSHA viewed the Reform Act, quite correctly, as solving few of their key problems. For this reason, they showed rather little enthusiasm for the act. MSHA's stable mission and high level of trust in the agency's hierarchy suggest a smooth acceptance of a minimal implementation of reform.

At a theoretical level, the argument confirms and extends the paradoxical findings of Daft (1978, 1982) that administrative innovations are more difficult to achieve in organically structured organizations. The results suggest that the same structure that facilitates the introduction of technical innovation also gives technical personnel sufficient autonomy to resist top-down administrative innovations. The current analysis adds an additional paradox. Precisely because relatively loosely governed, autonomous subunits (which facilitate technical innovation) cause problems for administrators, administrators in organic organizations will be motivated to seek the administrative innovations that are so difficult to achieve. In efficiency-based specialist organizations, administrative innovation will be less difficult, but also less needed.

Positioning strategy appears to be the engine driving these paradoxical results. The entrepreneurial generalist strategy does not explicitly encourage administrative innovations. In fact, it tends to foster a structural and cultural context that actively opposes administrative innovation. Indirectly, however, the strategy fosters diversity and complexity, which also create problems of coordination, thus encouraging managers to seek administrative innovation as a way of managing this diversity. The specialist strategy, by contrast, creates few problems in coordinating diverse activities, and therefore little enthusiasm for administrative change, but also little resistance to it.

The case studies reviewed above, being post hoc, do not represent a conclusive test of the paradoxes advanced. But they do begin to explain the dynamics of administrative change and resistance to it, and how these dynamics can differ as a function of seemingly unrelated general positioning strategies. Thus, the view that organic organizations are generally innovative (Hage & Dewar, 1973) is explicable in this framework. Although technical innovativeness has not been addressed, the results suggest that administrative innovations in such organizations will be attempted frequently, because administrators feel that control is needed; but attempts often will be unsuccessful, because operations-level personnel will be able to resist them. Further, the model helps to point out likely sources of resistance to administrative innovation. In specialist organizations in which administrative innovation would be relatively easy, administrators will tend to find no need

for it. In fact, because such innovation frequently is expensive (Galbraith, 1974), they may oppose it as reducing efficiency. In entrepreneurial generalist organizations, the ease of convincing administrators of the need for administrative innovation is of a piece with active and effective resistance from operations-level personnel.

This leads to a final word of caution on interpreting the "success" or "failure" of administrative innovation. By one criterion, adoption, both agencies have implemented the change, so both can be considered successful adopters of the innovation. By another criterion, policy-level intention for meaningful change, EPA's administrators clearly intended to rely more heavily on the act than did MSHA's; thus EPA might be considered more successful. By still another criterion, operations-level commitment to the innovation, EPA's personnel show far more distrust of the innovation, so that MSHA might be considered to be more successful. By a final criterion, the extent to which the innovation accomplished what those responsible for implementing it had intended, the results are more mixed. Because MSHA's administrators had few intentions for the act, they were satisfied to have implemented it in a legally and procedurally correct fashion. EPA's planners saw the reforms as helping them solve pressing problems of coordination and integration. These more ambitious goals have not been realized to date. Whether these goals can be met is yet to be seen.

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The Effects of Training, Goal Setting, and Knowledge of Results on Safe Behavior: A Component Analysis

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This study demonstrated the benefits of providing knowledge of results (KR) in addition to goal setting in a strategy to improve occupational safety in a farm machinery manufacturing firm. An analysis of variance (in a 56-week long multiple baseline investigation) revealed positive significant main effects for each of the interventions (safety rule training, goal setting, and KR).

Although recently there have been a host of studies demonstrating the effectiveness of various modification techniques for improving safety, the results appear to be confounded by the use of "package" programs. Most of the programs utilize a combination of different incentives, feedback, and/or sanctions. For example, various organizations have experienced improvements in safety performance through the use of feedback, competition, and incentives (Haynes, Pine, & Fitch, 1982); graphic feedback, supervisory praise, and goal setting (Komaki, Barwick, & Scott, 1978; Komaki, Heinzmann, & Lawson, 1980); feedback and supervision (Larson, Schnelle, Kirchner, Carr, Domash, & Risley, 1980); observation, contingent positive control, praise, and graphic feedback (Rhoton, 1980); social reinforcers (Smith, Anger, & Uslan, 1978); an informational and motivational feedback package (Sulzer-Azaroff, 1978; Sulzer-Azaroff & Santamaria, 1980); and informational feedback and token economies (Zohar, 1980; Zohar, Cohen, & Azar, 1980). It has been noted that more research is needed to determine the relative contributions of the various components of safety campaigns (Komaki et al., 1980), and this is the purpose of this investigation. Specifically, the present study addresses the relative effects of knowledge of results (KR) and goal setting.

Locke (1980) has stated that the findings obtained by Komaki et al. (1978) could have been a result of the goals that were set, which mediated the effects of the feedback. Such a conclusion stems from the considerable amount of research showing that intrinsic or extrinsic goal setting appears to be a necessary condition for KR to be effective (Latham & Yukl, 1975; Locke, Cartledge, & Koeppel, 1968; Locke, Shaw, Saari, & Latham, 1981). The question that remains is whether or not KR is a necessary condition for the effects of goal setting to be realized fully. In their recent review, Locke et al. (1981) concluded that goals and KR were reciprocally dependent; thus both were necessary to improve performance. This conclusion was supported by recent laboratory studies (Erez, 1977; Strang, Lawrence, & Fowler, 1978). However, one may question whether these results generalize to the real world. The field studies demonstrating this relationship have been few and have experienced potential problems. For example, Kim and Hamner's (1976) study did not include a "goals only" group; some information feedback was present in all the plants. Further, an evaluative type of an incentive, that is, praise, was present, and the effects of pure KR and goal setting may have been confounded. Similarly, Becker's (1978) study on residential energy consumption may have had an inherent extraneous variable confounding the results. As the KR plus difficult goals encouraged a reduction of energy usage, a monetary incentive via lower energy bills may have been operative. In any event, more research is needed to determine if the benefits of goal setting and KR generalize to other organizations and other behaviors.

Thus, the purpose of the present study is twofold. First, for theoretical advancement, it attempts to evaluate the possible reciprocal effects of KR and goal setting in an organizational environment. *It is hypothesized that performance (safety) will improve when specific, difficult and accepted goals are assigned. It also is hypothesized that employee performance will be further enhanced when employees receive feedback concerning their department's performance in relation to their goal.* The study does not question Locke's (1968) proposition that cognitive processes must operate before KR can be effective. It is concerned with the benefits of an extrinsic incentive such as KR in relation to a conscious goal or standard.

The second objective is of practical importance. The study attempts to evaluate systematically a possible effective strategy for improving occupational safety. Specifically, it will endeavor to demonstrate the positive effects of goal setting and KR on the frequency of safe behaviors and the consequent reduced probability of an industrial accident or injury.

Method

Setting and Subjects

Setting. The study was conducted in a farm machinery manufacturing plant located in southeast Louisiana. The company's top management

expressed a concern over the relatively large number of accidents being reported. The firm's accident rates were three times that reported by the National Safety Council (1980) for similar organizations.

The plant's safety program at that time consisted of posting commercial safety warnings signs. The management requested a program for motivating employees to work in a safe manner. They stipulated a preference for a program not utilizing extrinsic incentives such as monetary bonuses, safety prizes, and/or disciplinary action. It also should be added that improving safety performance was a goal unanimously set by the shop's first-line supervisors when they participated in a recent management by objectives (MBO) seminar. Thus, safety was a concern expressed by all the levels of management.

Subjects. An analysis of the company's accident reports for the previous three years revealed that 95 percent of the recorded injuries and illnesses occurred in 11 departments located in the shop area of the plant. It therefore was decided that the 105 full time employees in these departments would serve as subjects for the study. The departments are crating ($N=6$); final assembly ($N=25$); heavy equipment ($N=10$); hydraulics ($N=7$), machine shop ($N=6$); mechanics ($N=6$); painting/sandblasting ($N=5$); parts ($N=13$); raw material prep ($N=14$); subassembly ($N=8$); and welding ($N=5$).

Criteria Measures

Instrument. An observational checklist based on the company's safety manual (developed immediately prior to this study) was developed. The manual's items were classified as general safety, personal protective equipment, housekeeping, material handling, and tool and equipment use. Subcategories of items also were identified under the above classifications listed on the observation form. For example, under personal protective equipment, the observer could mark if an employee was wearing proper eye and face protection or hand and arm protection for the particular task he/she was performing at the time.

A pretest of the observation form revealed several ambiguities in the score form and the safety manual items. Therefore, a second list of 37 behaviorally specific safety items was developed for observational and training purposes. This list not only was more precise in the operational definitions of safe and unsafe acts than the safety manual, but it also focused on the behaviors judged by the first-line supervisors to be the most problematic and potentially hazardous. Examples of these items appear in Exhibit 1.

Observation Procedure. The observation procedure involved observing each employee in the 11 departments for 15 to 20 seconds. After observing an employee, the observer then recorded the individual's department, the date, the time of day (a.m. or p.m.), and his/her current activity or task on the safety check form. Next, the behavioral safety items that were applicable for the employee's activity were marked as being performed safely (✓) or unsafely (×). The observations were made in full view of the

Exhibit 1

Examples of Behavioral Safety Rules

General Safety:

When driving pins or bolts, check to see that no one is on the opposite side where they may be struck by a flying pin or bolt.

Personal Protective Equipment:

Approved safety glasses or goggles shall be worn when working beneath equipment where the danger of falling particles exists.

Housekeeping:

If oil, grease, or other liquid substances are spilled, wipe them up using rags or floor-dri so you or other employees will not slip or fall.

Material Handling:

Before attempting to drill, grind, or ream small objects, clamp or secure them first. Avoid holding the object with one hand while performing the operation with the other.

Tool and Equipment Use:

The use of buckets, chairs, fork-lifts, or other makeshift devices for work platforms is prohibited. Always stand on a ladder or scaffold when working more than 1 ft. off the ground.

employees, but attempts were made to record the scores unobtrusively. The observation session generally lasted about 2½ hours.

Observations were made two to four times ($\bar{X} \approx 3$) per week depending on the length of the work week. The observations were made at various times of the day and varying days of the week. They were never made twice on one day. Each observational session involved only one of three observers used throughout the study. (Exceptions to this policy were made when the reliability of the observations was being checked.) A total of 162 observations were made during the 56-week study (from January 1981 through February 1982).

Prior to actual data collection, the observers were trained to make the behavioral safety inspections. Training consisted of reviewing the abbreviated observational code and scoring form; viewing 35 mm slides that depicted the safe and unsafe acts to be observed; and making practice observations while accompanied by another observer. By having the observers make concurrent yet independent observations, interrater reliability could be assessed as a check for observer bias or instrumentation effects. To check reliability, a percentage agreement was used in which the number of agreements was divided by the total number of observations and multiplied by 100. An agreement was tallied when both raters scored an employee's behavior in an identical manner. Data collection began after the observers reached 90 percent agreement on the practice observations.

Computing the Safety Score. The main dependent variable being measured was the percentage of employees in each department performing their jobs in a completely safe manner. In this respect, safe performance of a job was considered to be all or none. It was possible for several of the behavioral safety items to apply to an employee performing any given task at any time. Although an employee may have been working in accordance with most of the applicable rules, if he/she was violating just one of the safety items, then there existed a possibility of an injury. Therefore, that employee was considered to be working unsafely.

After each observation session, the safety performance for each department was computed by dividing the number of employees working completely safe by the total number of departmental employees observed and multiplying by 100. Weekly departmental safety performance was determined by averaging the results of the observations made that week. As in other behavioral safety studies (Komaki et al., 1978; Komaki et al., 1980), this measure of safety accentuated positive behavior, that is, safe behavior. It was assumed that safe and unsafe behaviors were in competition; therefore an increase in one should have been associated with a decrease in the other.

A second dependent variable of the study was the frequency of on-the-job injuries, as recorded by the personnel director of the plant in accordance with the Occupational Safety and Health Act (OSHA) requirements (Public Law 91-596).

Since the accident data may have had deficiencies, a caveat must be issued concerning any conclusions drawn from it. Any change in the accident rate is of practical significance, but such changes must be considered tentatively because they may be a product of measurement variation and not an intervention procedure.

Design and Procedure

A multiple-baseline design was employed with a total of four phases: (1) baseline, (2) training only, (3) training and goal setting, and (4) training, goal setting, and knowledge of results. Baseline data were collected in all 11 departments, and the intervention phases were introduced in a staggered sequence across groups of departments.

A crucial feature of the multiple-baseline design is the introduction of the treatment at staggered intervals. By introducing the interventions at different points in time, one can assess not only whether safety performance changes, but also when performance changes. When the treatment is introduced at different times and safety performance changes only when the intervention is implemented, then one can rule out alternative plausible hypotheses such as maturation, history, and others with much greater confidence (Hersen & Barlow, 1976; Komaki, 1977).

The departments were divided into three groups based on their proximity to one another and perceived amount of interdepartment interaction. The groups were: Group 1—final assembly, hydraulics, mechanics, and painting/sandblasting; Group 2—heavy equipment, raw material prep, sub-assembly, and welding; and Group 3—crating, machine shop, and parts. Combining the departments also was done in order to conduct safety meetings efficiently and to introduce each stage of the program without severely disrupting production. Data, however, were collected on a departmental basis.

Training Only. At the beginning of the fourteenth week of the study, workers in Group 1 attended a safety training session that lasted from 45 to 60 minutes during their regular workday. The training session began with

the company's executive vice-president and general manager addressing the workers. He explained to them that the majority of accidents were caused by someone performing an unsafe act. He further added that the responsibility for industrial safety was found at all levels of the organization. Therefore, he asked their (the workers') cooperation in following the regulations stated in the safety manual, in order to reduce the chance of injury by working in a safe manner. The meeting was then turned over to the safety supervisor.

The safety supervisor (with the authors' assistance) then reviewed the safety manual with the employees. During this review, he instructed the employees to make certain additions and/or corrections to some of the safety items in their manual. These revised rules provided the employees with the specific behavioral items used for making observations. Next, the employees were shown a series of 35 mm slides depicting the unsafe and safe behaviors specified by the observational code. The slides were taken after work hours and involved employees of the electrical-maintenance department. The workers attending the training session were told that the actions exemplified in the slides were carefully posed for illustrational clarity. Although the majority of the slides pertained to behaviors for the entire shop in general, a few slides depicted behaviors and situations specific to a certain department or group of departments. Each group viewed a total of 38 slides: 17 pairs of safe and unsafe illustrations, 3 slides depicting actual housekeeping violations, and 1 slide exemplifying "horseplay."

The employees first viewed a slide depicting an individual(s) performing a task unsafely. As a group, the workers were asked to state verbally what they observed to be correct or incorrect ("What's safe or unsafe here?"). Invariably, the employees could recognize the unsafe behaviors exemplified in the slide. After the unsafe behaviors were identified, a slide illustrating an individual doing the same job safely was shown and the corresponding safety rules were restated. For the four unsafe behavior slides, the applicable results were simply restated.

During this meeting, the employees also were shown the observational form and told how their department's safety performance was being observed and measured. The meeting ended with a question and answer period.

The "training only" phase lasted 10 weeks. The second group received the training sequence after 16 weeks of baseline and the third group after the 18th week of baseline. The training only phase continued through the 26th and 28th weeks of the study for these two groups, respectively. The effects of training were considered to be irreversible, and training remained a factor in each of the subsequent phases. A review of the safety measure and behavioral items became a constant part of all the following safety meetings.

Goal Setting and Training. At the beginning of the 24th, 27th, and 29th weeks of the study, a safety performance goal was assigned to Groups 1 through 3, respectively. The safety goal was based on three considerations. First, in accordance with previous goal setting research (Latham & Yukl,

1975; Locke, 1968; Locke et al., 1981) the goal had to be specific. Second, the goal had to be perceived as difficult but attainable. The third goal criterion for this particular study was that the safety goal be the same for each department. Different department safety goals may have suggested a difference in previous performance, that is, the employees may have received implicit KR from different goals being assigned. It was recognized that assigning a constant goal for the entire plant may have varied the difficulty of the goal for departments performing at different levels of safety. Prior to assigning the goal, however, the supervisors from each of the departments agreed that the goal was specific and difficult but attainable by their employees. Therefore, possible differences in perceived goal difficulty across departments were considered to be less disturbing than possibly allowing implicit KR to confound the results of this phase of the study.

The goal setting phase was introduced (at staggered intervals across groups) by posting a 12" x 12" sign which read "SAFETY GOAL—90%." After the signs were posted, the employees attended another safety meeting during working hours. During this 30-minute meeting, the employees were told that the safety goal was related to their *department's* weekly safety performance. Weekly performance was determined by averaging the results of the observations made that week. It also was mentioned that 100 percent weekly safety performance was unrealistically high and therefore not expected. It was noted that if 90 percent of all the shop employees performed their jobs completely safely, then not only would the goal be attained, but the frequency of injuries would be decreased as well.

The workers were asked to raise their hand if they thought their department could reach the goal. They also were requested to indicate in a similar manner if they would try to help their department achieve the safety goal by working safely in accordance with the observational code and safety manual. The overall response to these queries was always positive, that is, an across-group average of 95.79 percent of the employees gave an affirmative response to each question.

After this initial goal setting meeting, the department supervisors were asked to remind their employees each week to try to achieve the safety performance goal. Five weeks after the goals were set, the safety supervisor issued a written reminder to encourage the departments to achieve the goal. This reminder was posted near the safety goal sign in each department. The goal setting and training phase lasted 16 weeks for each group.

Feedback, Goal Setting, and Training. Employees in Group 1 began receiving feedback, that is, KR, concerning their department's safety performance during the 40th week of the study. Three weeks later (43rd week), Group 2 employees began receiving KR. The third group of departments received KR starting the 45th week of the study. The goal setting sign and goal reminder remained posted during this fourth phase of the study.

The procedural sequence for the feedback phase was as follows. A 60-minute safety meeting was scheduled for the group during regular work hours. The first half of this meeting was devoted to the employees completing

a job satisfaction questionnaire consisting of three parts: a bipolar adjectives section, a section with contingency statements, and an open-ended comment section (Reitz, 1971; Scott, 1967; Scott & Rowland, 1970).

The next step involved showing the employees in each department their respective average performance as recorded by the observers. To do this, a 12" x 15" sign was made for each individual department. The sign depicted an incomplete line graph with the abscissa labeled "WEEK" and the ordinate labeled "AVERAGE SAFETY PERFORMANCE (%)." The 90 percent mark on the vertical axis was highlighted in reference to the goal level. In addition, the goal level was designated by a horizontal red line drawn at 90 percent. For each department, the average level of performance observed and recorded for the goal setting and training phase was marked on the vertical axis of the graph and thus provided the employees with their first KR in relation to the goal or standard. These features of the graph were explained to the employees.

The workers then were told that the observers would continue to make safety observations approximately three times a week at various times and on various days. The graphs were posted in their respective departments, and after each observation session the observer recorded the results on the sign. At the end of each week the department's average performance was recorded on the graph. Thus, the departments received KR two to four times per week depending on the length of the work week.

During the feedback intervention phase, none of the observers provided any explicit evaluative feedback concerning the departments' progress (or regress) in relation to the goal. Attempts were made to provide only information regarding the level of performance in relation to the standard. While such KR may have produced implicit evaluation of performance, this evaluation had to have been intrinsically derived, that is, the employees themselves were the source. The supervisors of the departments were asked to continue mentioning the safety goal on a weekly basis. They were not asked to provide any praise or reproof based on their departments' performance during this phase. Though such action on the part of the supervisor could not be totally controlled, any observances of supervisory personnel making evaluative comments were noted.

The knowledge of results, goal setting, and training phase lasted at least 12 weeks for each group of departments.

Results

In order to present the findings of the study succinctly, this section reports the results of the data analysis for the three groups (of departments) across which the interventions were staggered. The results of data analysis performed on a departmental basis essentially substantiate the results presented here.

Observational Reliability and Validity

In an effort to estimate the reliability of the observational procedure, interrater reliability employing the percentage agreement method was assessed 11 times throughout the course of the study. The mean agreement between the primary observer and the secondary observer (assessed 7 times) was 87.68 percent. The average agreement between the primary and tertiary observers (assessed four times) was 89.71 percent. Overall, the average interrater reliability was 88.41 percent.

To estimate the validity of the behavioral measure of safety, rank-order correlations between the departments' injury rates and their mean behavioral performance during the study were to be computed. However, the accident rates (computed per 100 employees as described by the National Safety Council, 1980) for the departments were too low to permit meaningful correlations. Because the baseline performance is assumed to be an extrapolation of previous performance, then correlating baseline levels with previous accident rates may provide an estimate of the validity of the observational procedure.

The Spearman correlation coefficient for the departments' overall-injury rate and mean baseline performance was $-.85$ ($p < .001$). The correlation between departmental lost-time injury rate and mean baseline performance was $\rho = -.69$ ($p < .01$). These figures indicate that the higher the behavioral performance, the lower the accident rates. This provides at least an indirect indication of the validity of the measure, but it must be reiterated that the results should be interpreted cautiously: accident records tend to be unreliable.

Manipulation Checks

Training. The results of a quiz administered midway through the training only period indicated that overall, the employees ($N = 87$) could identify 81.77 percent of the safe and unsafe behaviors exhibited in the slides.

Goals. Several bipolar adjectives and contingency statements were incorporated in the job satisfaction questionnaire completed by the employees prior to the introduction of the KR phase. Specifically, 11 items were included to assess goal acceptance; 3 items were for perceived goal difficulty, and 1 item was for goal clarity. Three separate items were included to estimate the perceived probability that the supervisors would give their employees positive (praise), negative (reprimand), or corrective feedback for performing safe or unsafe behaviors. All the items were scored on a 7-point scale with 7 being the desired response. Of the 96 employees, 86 who had been through each phase of the study responded. The mean response for each factor measured appears in Table 1.

Overall, the employees considered the goal to be acceptable ($\bar{X} = 5.78$) and clear ($\bar{X} = 5.82$). They also perceived the goal to be slightly difficult ($\bar{X} = 4.54$). The probability that the supervisors would praise the employees

Table 1
Mean Group Response for Each Questionnaire Factor

Factor ^a	Group			All n=86
	1 n=35	2 n=32	3 n=19	
Goal acceptance	5.72	5.94	5.65	5.78
Goal clarity	5.94	5.75	5.84	5.82
Goal difficulty	4.77	4.55	4.08	4.54
Positive feedback	3.00	3.59	3.15	3.28
Negative feedback	5.46	5.97	4.73	5.49
Corrective feedback	4.57	5.03	4.47	4.76
Current safety	4.94	5.44	4.94	5.12
Estimated performance (%)	77.23	82.50	77.47	79.43

^aMean responses are based on a 7-point scale with a score of 7 being desired.

for working safely was low ($\bar{X}=3.28$). On the other hand, employees expected to receive corrective feedback ($\bar{X}=4.76$) and/or be reprimanded ($\bar{X}=4.49$) for performing an unsafe act. The employees also indicated that they and their fellow workers generally worked in a safe manner ($\bar{X}=5.12$).

The employees involved in the study also were asked (prior to receiving KR) to estimate their department's behavioral safety performance. In general, they estimated their performance to be lower ($\bar{X}=79.43$ percent) than the goal of 90 percent that they had been assigned and apparently accepted.

At the end of the KR phase of the study, the employees were asked to write what they perceived their current department goal to be. The mean goal of the 77 employees responding was 95.75 percent. All three groups had mean goals of 94 percent or higher. Thus, there is some indication that they were trying to achieve a level that was higher than assigned or expected of them.

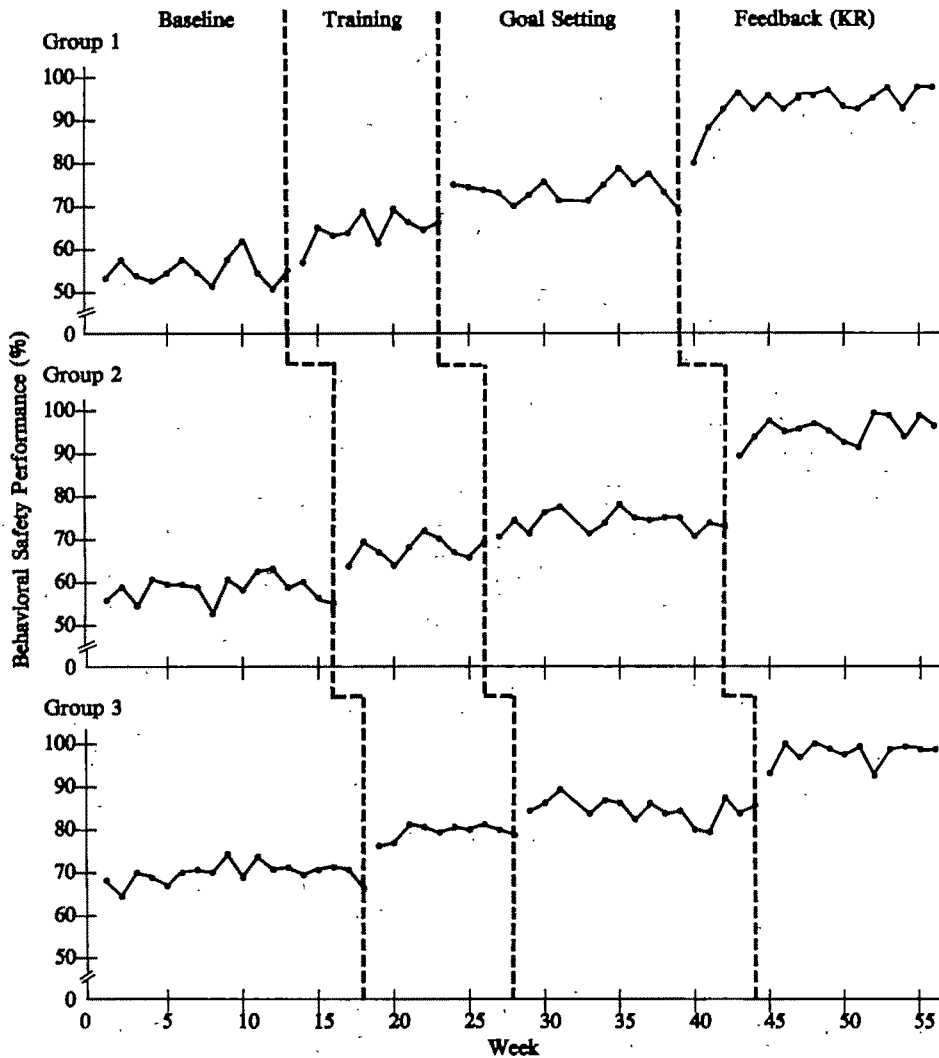
Observational Data Analysis

ARIMA Analysis. The first step in the analysis of the observational data was to estimate the model that appeared best to fit the time-series. This was accomplished with the use of the autoregressive integrated moving average (ARIMA) modeling technique developed by Box and Jenkins (1976) and recommended by McCain and McCleary (1979) for interrupted, time-series analysis.

Visual inspection of the weekly average performance (shown graphically in Figure 1) indicated that there appeared to be marked intervention effects. Therefore, it was decided to perform the ARIMA analysis on the raw observational data for each period within each group to estimate the model that appeared to fit the entire time-series. The SAS computer program for ARIMA requires at least 30 observations (SAS Institute, 1980). This condition was met for each period. For clarity, Figure 1 presents only a summary of the observational data.

The resulting autocorrelations and partial autocorrelations exhibited a stationary process for each period. Differencing of the data did not appear

Figure 1
Average Weekly Behavioral Safety Performance for Each Group



to be warranted; there was no indication of a statistically significant secular trend for any of the periods. Further, the analysis did not reveal any significant autoregressive or moving average component. In other words, the autocorrelation function and the partial autocorrelation function were interpreted as identifying an ARIMA (0, 0, 0) model. Further evidence supporting the assumption that the data reflected a stochastic component or "white noise" model was found with the autocorrelation check of residuals. The Q-statistic (essentially a chi-square goodness-of-fit test for the autocorrelations) was not significant for any of the periods or groups; thus it could

be concluded that the estimated autocorrelation of the nonadjusted time-series data depicted a white noise process (McCain & McCleary, 1979).

Repeated Measures ANOVA. Given that the raw data within each period for each group resembled random fluctuations (i.e., a stationary process), a repeated measures analysis of variance with blocking on groups was considered appropriate for testing the hypothesis. The result was a highly significant main effect for the period or phase of the study ($F = 103.68$, $df = 3$, $p < .0001$). A Duncan's multiple range test then was performed on the period means. As expected, the means for each period were significantly different. Inspection of the means for each period (Table 2) revealed that they were in the hypothesized direction. Briefly, the mean performance after KR was introduced ($\bar{X} = 95.39$ percent) was substantially higher than after a goal was set without KR ($\bar{X} = 77.54$ percent). Performance during the goal setting phase was higher than the training only phase ($\bar{X} = 70.85$ percent), which in turn was better than baseline performance ($\bar{X} = 62.20$ percent). Inspection of the means for each group (presented in Table 2) and the weekly summary data (Figure 1) also reflects the differences in behavioral safety period performance for each intervention period.

Table 2
Mean Group Safety Performance for Each Period^a

Period	Group			All
	1	2	3	
Baseline	55.86	59.05	69.49	62.20
Training	65.49	67.96	79.38	70.85
Goal setting	73.33	75.19	84.01	77.54
Feedback (KR)	93.35	96.02	97.58	95.39
All	73.79	74.37	81.25	

^aSafety performance refers to the percentage of employees working in a completely safe manner.

Accident Data

The overall injury incidence rate and the lost-time injury incidence rate were computed only for the shop area of the plant. The rates reflect the number of injuries per 100 employees (National Safety Council, 1980). The average total incidence rate for the three years prior to the study (1978-1980) was 84.77 injuries. The yearly rate for 1981 was 55.14 injuries. The lost-time rates decreased from an average of 21.20 injuries to 9.88 injuries in 1981. These data must be interpreted with caution because the safety record-keeping procedures had changed during the four-year period (i.e., 1980).

Discussion

Theoretical Implications

The major finding of this study is that knowledge of results (KR) appears to be a beneficial condition for the achievement of maximum performance

when specific and difficult but acceptable goals are set. Although behavioral safety performance did improve significantly after a goal was assigned and apparently accepted, in general the goal was not achieved until KR was provided. In fact, 10 of the 11 departments averaged above the goal during the KR phase whereas, only 2 of 11 departments achieved the goal without KR. Thus, the evidence presented in this study provides external validity of the laboratory findings of other recent investigations (Erez, 1977; Strang et al., 1978). Further, the multiple-baseline design and time-series analysis of the present study corrected some of the potential methodological problems associated with other related field studies (Becker, 1978; Kim & Hamner, 1976) and substantiated the findings of these studies. By staggering the introduction of the interventions, the need for a control group was reduced. (In this field experiment, a control group was considered not to be feasible ethically or practically.)

Improvements occurred immediately following the interventions in all three groups at three different times, making it possible to rule out extraneous factors as determinants of performance improvement. It is highly unlikely that outside events could have coincided with the introduction of the treatment phases in all three groups and produced similar effects immediately in each. Because the observations were conducted during all phases of the study and any observer reactivity effects should contribute a constant error throughout, observer reactivity also was ruled out as a source of internal invalidity.

One question that now can be raised is what is the function or role of goal setting? A possible answer stemming from the results of the present study is that goals "motivate" individuals to perform. Though safety performance did increase significantly after training, further improvement was seen almost immediately after a goal was assigned and accepted. In support of Locke's (1968, 1980) theory, the sharp increase at the beginning of the goal setting phase (Figure 1) suggests that the employees *cognitively chose* to increase their efforts to work in accordance with the behavioral safety rules.

The results of the questionnaire completed prior to the introduction of explicit KR may indicate an alternative hypothesis concerning the behavioral performance during the goal setting phase. The self-report measure revealed that the employees probably had not received much positive feedback (i.e., praise) from their supervisors concerning their safety efforts. However, they did believe they were likely to be reprimanded and/or corrected if they performed their job unsafely. Whether the supervisors increased their efforts to correct and/or to reprimand an unsafe subordinate after the goal was assigned could not be directly assessed in this setting. It is suspected that this was not the case because the supervisors had known what the rules were prior to the baseline period and were expected to enforce them as part of their regular duties. Further, as Locke (1980) suggested, one would expect more of a gradual improvement if these extrinsic conditions (i.e., reprimand and/or corrective feedback) were the primary causal factors.

Because the increase in performance was sharp after goals were assigned and accepted, the more plausible hypothesis is that the employees were "motivated" or were attempting to achieve their goal because they cognitively chose to do so.

A second query posed by the results of the current investigation concerns the role of KR in relation to goal setting. One possible explanation that has been suggested is that KR may lead to an increase in effort (Becker, 1978; Latham & Yukl, 1975). There is evidence for this hypothesis in that most of the departments did not achieve the goal until KR was introduced. Even though the majority of employees reported perceiving their department's performance to be less than the goal prior to receiving KR, actual goal achievement was infrequent. The KR may have served to substantiate their perceptions and thus they realized more attention to safety was required if they were to achieve the goal.

A second possible function of KR is that it may be used by individuals to set new standards or goals (Latham & Yukl, 1975; Locke, 1968, 1980). Evidence for this postulate was found when most of the employees perceived their department's goal to be closer to 95 percent after the KR phase, as opposed to the assigned 90 percent safety goal. It is possible that once the employees knew they could achieve the goal, then they set new goals. Because goals were limited to a maximum of 100 percent, attempts to achieve new, higher goals (i.e., within the 90 percent to 100 percent range) served to maintain the high level of performance exhibited by most of the departments during the KR period.

Still a third possible function of KR is that it permits intrinsic reinforcement when it indicates goal achievement (Hall & Foster, 1977; Hall & Hall, 1976). The continuance of goal level performance after KR was provided may suggest that the employees were being reinforced for their accomplishment. There was little evidence of extrinsic incentives (i.e., supervisory praise or safety awards). Thus any operating reinforcers probably would have to be intrinsically derived. As Komaki et al. (1980) found, some informal competition seemed to be present among the various departments. Further, the employees appeared to be quite interested when the daily and/or weekly KR was marked. Thus, there is at least indirect evidence suggesting that KR signifying goal achievement was valued and probably rewarding.

In sum, the results of this investigation indicate that KR plus goal setting improves performance more than does goal setting alone. As Locke (1968, 1980) reported, however, assigning an acceptable, difficult, and specific goal can lead to an increase in performance. This study revealed that adding KR improves performance even more. The function of KR in relation to goal setting can only be speculated from the evidence of this investigation. It can be hypothesized that KR: (1) leads to an increase in effort, (2) encourages new goals to be attempted, and/or (3) reinforces performance. It also may be that KR serves all three functions simultaneously. Whatever the reason, KR appears to be a beneficial supplement for the maximum effects of goal setting to be realized.

Practical Implications

The results of this study also have practical implications in the area of occupational safety. Behavioral safety rules were obeyed more when employees received frequent feedback concerning their performance in relation to an accepted standard. Though the implementation of a training session to teach employees exactly what was expected of them did result in a significant increase in performance, it was not sufficient for optimum improvement. Instead, assigning employees specific, difficult yet acceptable safety goals, and providing information concerning their performance in relation to the goals, resulted in considerably more improvement.

These results essentially generalize the findings of Komaki et al. (1980) to a different organization. Both investigations provide alternatives to the utilization of disciplinary sanctions or extrinsic incentives (i.e., safety awards) to encourage compliance with the rules. The present investigation differed from Komaki et al.'s (1980) because it did not confound the effects of KR in relation to a goal with the effects of supervisory praise. The results suggest that the former may be sufficient to obtain substantial increases in behavioral performance. The durability of the effects of such a safety campaign remains to be seen. In this study, overall performance stayed above the expected goal level for a minimum of 12 weeks after KR was introduced.

Another finding of practical importance is that there is at least indirect evidence supporting a behavioral approach to safety. First, rank-order correlations revealed significant inverse relationships between departmental baseline performance and injury rates (both overall and lost-time injuries). Second, when a program was implemented to improve behavioral safety performance, the yearly accident rates per 100 employees decreased in comparison with the company's previous yearly average. In fact, the company estimated that the reduction in lost-time injuries alone resulted in monetary savings of at least six figures. Extended monitoring of behavioral performance and accident rates may provide further evidence of the benefits and limitations of this approach.

Conclusions

The benefits stemming from the provision of knowledge of results in relation to acceptable assigned goals has both theoretical and practical significance. Goal setting plus training, and training only each had positive effects on behavioral safety performance; but the addition of KR resulted in even greater increases in performance. Future research is required to determine the role(s) fulfilled by KR with regard to goal setting. In addition, the generalizability of the findings to other organizations and/or other behaviors remains an issue of concern.

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The Effects of the Application on Recall of Information from the Interview

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Two laboratory experiments were conducted to test the extent to which initial impressions of applicants formed from paper credentials bias information recalled from interviews with these applicants. When describing a candidate with poor credentials subjects recalled less favorable information from the interview itself, perceived the interviewee as exhibiting fewer favorable behaviors and traits in the interview, and rated performance in answering the questions of the interviewer as poorer.

With the possible exception of such obvious forms of quackery as graphology, phrenology, and astrology, no other personnel selection technique is held in as low esteem in the research literature as the interview. Interviewers appear to make judgments that often are unreliable and invalid (Mayfield, 1964; Ulrich & Trumbo, 1965; Wagner, 1949). They also appear to exhibit a variety of biases in their processing of information (Arvey & Campion, 1982; Schmitt, 1976; Wright, 1969). Among the biases demonstrated in past research are: contrast effects, in which the evaluation of a candidate is influenced by the level of qualifications of preceding candidates (Wexley, Sanders, & Yukl, 1973; Wexley, Yukl, Kovacs, & Sanders, 1972); negativity biases, in which raters are influenced more by unfavorable than by favorable information (Constantin, 1976); and primacy effects, in which the information first presented on a candidate influences final evaluations more than information presented later (Blakeney & MacNaughton, 1971; Bolster & Springbett, 1961; Carlson, 1971; London & Hakel, 1974; Peters & Terborg, 1975).

Despite the rather bleak picture painted in past research, recent studies provide some glimmer of hope for the interview. Interviewers appear capable

of predicting the job success of applicants with a statistically significant, albeit modest, degree of validity (Grant & Bray, 1969; Landy, 1976; Latham, Saari, Pursell, & Campion, 1980). Furthermore, there is increasing evidence that the interview can provide valuable information on the applicant's work motivation, interpersonal skills, and personality characteristics (Jackson, Peacock, & Smith, 1980; Ulrich & Trumbo, 1965). The most serious problem is not that the interview totally lacks reliability and validity but that it often lacks functional validity, or as Ulrich and Trumbo state, "the majority of valid variance in predictions [is] contributed by tests and/or credentials rather than by the face-to-face interview" (1965, p. 113). To increase the interview's functional validity, a better understanding is needed of the effects of paper credentials on the interviewer's retrieval of information from the interview. Pursuant to this end, two experiments were conducted to examine the biasing effects of the applicants' paper credentials on interviewers' impressions of the interview.

The studies reported in the present paper were designed to test predictions derived from a model of the interview recently set forth by Dipboye (1982). According to this model, the failure of the face-to-face interview to increase predictive validity over and above the validity obtained from evaluation of paper credentials results in part from the tendency of interviewers' postinterview impressions of the applicant to conform to their preinterview impressions. The effects of preinterview impressions on postinterview impressions are mediated by both behavioral and cognitive biases. The present research held behavioral biases constant and tested predictions for one such cognitive bias, the assimilation of perceptions of the interview performance to the level of qualifications in the application. One prediction tested is that subjects are more likely to recall and recognize information that is consistent with their impressions of the application than they are information that is inconsistent with these impressions. A second prediction is that interviewers who preview applications before they interview are less accurate in their retrieval of information from the interview than are interviewers who interview without previewing the application. A third prediction is that interviewers, as a consequence of their biased retrieval of information, perceive interviewees with good applications as performing better in the interview than interviewees with poor applications.

Primacy effects found in microanalytic research on the interview provides indirect support for the prediction that preinterview impressions formed from applications bias postinterview evaluations (Blakeney & MacNaughton, 1971; Bolster & Springbett, 1961; Carlson, 1971; London & Hakel, 1974; Peters & Terborg, 1975). Primacy effects seem more likely to occur when the initial data are negative (Peters & Terborg, 1975) and when one final overall evaluation is made after all information on the applicant is presented (Farr, 1973; Farr & York, 1975). Although most evidence from microanalytic research on the interview appears to support primacy effects, at least two studies report findings similar to contrast effects (Bolster & Springbett, 1961; Carlson, 1971). Specifically, raters evaluated highly

unfavorable information on the applicant less favorably when it was preceded by favorable information than when it was preceded by unfavorable information; and highly favorable information was evaluated more favorably when it was preceded by unfavorable information than when it was preceded by favorable information. The findings are somewhat mixed as to whether the recall of information on a stimulus person is assimilated to first impressions. Although the findings of some social cognition research suggest that information that is consistent with prior impressions is more likely to be recalled than information inconsistent with prior impressions (Snyder & Uranowitz, 1978), other research has found just the opposite effect (Hastie, 1981). Social cognition and microanalytic interview research on order effects is of limited relevance to the assimilation prediction tested in the present research, however. The typical study presents disconnected bits of information, without distinguishing between paper credentials and the face-to-face interview.

Several other experiments have tested for the effects of paper credentials using more realistic stimulus conditions. Springbett (1958) had interviewers rate applicants after examining the application, after seeing the applicant for the first time, and, finally, after conducting a face-to-face interview. He found that in 88 percent of the interviews studied, the final appraisal of the applicant conformed to the preinterview appraisal of the application form. Huguenard, Sager, and Ferguson (1970) provided bogus feedback to interviewers that a job candidate possessed a warm or cold personality and found that interviewers described the candidate after interviews with words that were consistent with their preinterview set. Tucker and Rowe (1979) found that regardless of the favorability of the interviewee's answers in the interview, interviewers who were given a favorable personal reference for the interviewee before reading a script of the interview rated the interviewee's qualifications higher than did those given an unfavorable reference. Finally, Latham, Wexley and Pursell (1975) found evidence of halo bias in which managers' postinterview evaluations of applicants' educational background tended to conform to their preinterview impressions of the applicants' paper credentials.

Although these four experiments supported the notion that postinterview evaluations tend to conform to preinterview impressions of the application, none of them tested the prediction that perceptions of the interview are assimilated to impressions of the application. A rigorous test of this prediction requires an experiment in which the interview performance of the applicant is held constant and the effects of paper credentials on the interviewer's recall and evaluation of information from the interview are measured. Neither Springbett (1958) nor Huguenard et al. (1970) controlled for differences in the interview performance of the applicant across conditions. Thus, one cannot determine from their data if differences in postinterview evaluations of the candidates resulted from biased retrieval of information from the interview or if candidates with poor applications actually performed more poorly in the interview than did those with better

applications. Latham et al. (1975) and Tucker and Rowe (1979) avoided this problem by holding the interview itself constant, but neither measured subjects' perceptions and recall of the interviewees' performances in the interview. One cannot determine from the results of these studies whether subjects assimilated information in the interview to their impressions of the application or if they deemphasized, discounted, or ignored the interview altogether.

In summary, despite the crucial role of recall as a determinant of rating errors (Wherry & Bartlett, 1982), no research has assessed the biasing effects of the application on the retrieval and evaluation of information from the interview. The first experiment in the present paper tests the prediction that observers tend to recognize and recall more favorable information from interviews when the applicant appears highly qualified from his/her paper credentials than when the applicant appears unqualified "on paper." The findings of the first study led to a second experiment that assessed the relative effects of the favorability of the application and the interviewee's interview performance on accuracy of recall and evaluation of qualifications.

Experiment 1

In the first experiment, the applications of interviewees were varied to create the impression that the interviewees possessed either low or high qualifications for a position. Subjects also viewed videotaped interviews with two candidates for the position. The predictions were that when judging an applicant with a good application, relative to an applicant with a poor application, observers would recall more positive information from the interview, use more positive behaviors and traits in describing the interview performance, and evaluate the overall performance in answering the questions of the interviewer more favorably.

The order in which the applications and the videotaped interviews were presented also was varied to assess the extent to which the application influences interviewers' encoding and storage of information as they observe the interview, as opposed to influencing the search and retrieval of information at the time of the final ratings. The former has been referred to as an observation-time mechanism and the latter as a rating-time mechanism (Larson, 1982). Previous experiments on the effects of the application on postinterview evaluations (Huguenard et al., 1970; Latham et al., 1975; Springbett, 1958; Tucker & Rowe, 1979) all confounded observation-time and rating-time mechanisms by presenting paper credentials before subjects observed the interview. If the observation-time mechanism is the primary mediator of the biasing effects of the application, then the application should affect recall and final evaluations only when it is presented before the interview. Such a finding also suggests a solution, that is, interviewers should interview and evaluate the candidate's interview performance before reviewing paper credentials. Although no specific predictions are made in this study, the preponderance of research findings in experimental social

psychology appear to support the preeminence of observation time effects (Rothbart, Evans, & Fulero, 1979; Zadney & Gerard, 1974).

Method

Overview of the Experimental Design. Subjects in the experimental conditions evaluated two applicants for a sales job on the basis of information in applications and videotaped interviews with the applicants. The experimental design was a $2 \times 2 + 1$ factorial with the first factor (order of the presentation of the application and the videotape) constituting a between-group factor and the second factor (level of qualifications depicted in the application) constituting a within-subjects factor. Control subjects based their evaluations only on the videotaped interviews.

Procedure. Subjects were 92 undergraduates at Rice University who participated in groups of one to four for extra course credit in psychology courses. The data of eight subjects were discarded because they recognized the actors in the videotaped interviews. Subjects were told that they would evaluate the qualifications of two applicants for a sales position. After reading a description of the duties of this position, subjects in the experimental conditions were shown the applications and videotaped interviews of two applicants. The interviewees were two male graduate students who provided a mix of positive and negative information on their qualifications. The order in which the two videotapes were presented was counterbalanced within the experimental and control conditions to control for possible contrast effects (Wexley et al., 1973).

The applications were constructed to present information nonredundant with the interviews. The good application depicted a highly qualified candidate with a 3.93 grade point average (g.p.a.), three previous sales positions, major in business and course work in chemistry, and good recommendations. The poor application presented a poorly qualified candidate with 1.62 g.p.a., experience as a cook and cashier, a major in physical education, and mediocre references. In the experimental conditions, each videotape was paired an equal number of times with the poor application and with the good application. Half of the subjects in the experimental conditions viewed the application materials first and then the videotaped interviews; the other half viewed these in the reverse order. Control subjects evaluated the applicants only on the basis of the videotaped interviews.

Dependent Measures. After seeing the application and videotape for a candidate, subjects in the experimental conditions were asked to "list some of the things you learned about the interviewee on the basis of his responses during the interview." Three independent judges rated the favorability of each separate bit of information listed in the free recall task as positive, neutral, or negative. The *net recall measure* was the difference between the number of positive and the number of negative bits of information recalled. The interrater reliabilities on net recall for raters 1, 2, and 3 were sufficiently

high ($r_{12} = .869$, $r_{13} = .949$, $r_{23} = .929$) to justify using the average of the difference measure across the three raters as the dependent measure.

After completing the free recall task for an applicant, subjects were given a checklist of traits and interview behaviors, taken from Hakel and Dunnette (1970), and were asked to indicate which behaviors and traits were exhibited by the interviewee during the interview itself. The difference in the frequency with which positive and negative traits and positive and negative behaviors were chosen in describing the interviewee's performance were the *net trait and net behavior measures*, respectively.

After performing the recall and recognition tasks, subjects were asked to evaluate the candidates on several 9-point Likert scales. The questions are listed in Table 1.

Table 1
Means for Manipulation Checks and Dependent Measures
for Poor, Good, and No Application Groups

	Application Qualifications			F*
	Poor	None	Good	
1. How well do you think this candidate's experience fits the job?	2.48 ^a	4.23 ^b	7.56 ^c	260.09
2. How would you evaluate the applicant's academic record?	2.34 ^a		8.27 ^b	328.79
3. How well do you think this candidate's education and training fits this job?	2.59 ^a	5.09 ^b	7.30 ^c	235.70
4. How would you evaluate the candidate's qualifications for the job on the basis of the references?	2.05 ^a		8.34 ^b	401.71
5. How good of a job did the candidate do in answering the interviewer's questions?	4.57 ^a	5.16 ^b	5.39 ^b	6.61
6. Would you invite this candidate to visit your company for a second interview?	3.30 ^a	5.07 ^b	7.38 ^c	107.71
7. Would you hire this person?	4.02 ^a	5.09 ^b	6.27 ^c	18.31
8. Would you personally like this candidate?	4.71 ^a	5.32 ^b	5.71 ^b	8.86
9. Net number of positive items recalled	-1.57 ^a	-.15 ^b	.66 ^b	10.83
10. Net number of positive behaviors attributed to interviewee	1.96 ^a	3.80 ^b	5.30 ^b	13.41
11. Net number of positive traits attributed to interviewee	1.76 ^a	4.29 ^b	5.74 ^b	15.18
12. How would you evaluate this candidate's qualifications for the job?	3.28 ^a	4.93 ^b	6.39 ^c	112.14

*The *F* test for the main effect for application qualifications had *df*'s = 1,81 for all items except items 2 and 4 in which case the *df*'s = 1,54. Comparisons between the no application control group and the two treatment means were made with Dunnett tests and means not having common superscripts (a, b, c) significantly differed, $p < .05$.

Results

Analysis of the Manipulation Checks. A $2 \times 2 + 1$ ANOVA (Winer, 1971) performed on responses to each manipulation check item revealed only significant main effects for application qualifications. In support of the manipulation, a candidate with a poor application was rated as having poorer recommendations ($\omega^2 = .878$, $p < .0001$), education and training ($\omega^2 = .7317$, $p < .0001$), job experience ($\omega^2 = .7517$, $p < .0001$), and academic record ($\omega^2 = .7484$, $p < .0001$) than was the candidate with a good application. Dunnett tests (Winer, 1971) revealed that the control candidates were rated significantly lower than the high qualifications candidates and

significantly higher than the low qualifications candidates on job experience and training (see Table 1).

Analysis of the Dependent Measures. A preliminary multivariate ANOVA performed on responses of the experimental subjects to the major dependent measures yielded a highly significant multivariate main effect for application qualifications [Wilks $\lambda = .30$, Rao's $F(8,43) = 11.79$, $p < .0001$]. No other effects were statistically significant. Separate $2 \times 2 + 1$ univariate ANOVAs revealed only main effects for application qualifications on the net favorability of items recalled from the interview ($\omega^2 = .063$, $p = .001$); the net favorability of behaviors ($\omega^2 = .0799$, $p = .0002$) and traits ($\omega^2 = .1105$, $p = .0002$) used to describe the interview performance of the applicant; the rated performance of the applicant in answering the interviewer's questions ($\omega^2 = .0590$, $p = .0119$); the willingness to invite the applicant for a second interview ($\omega^2 = .5576$, $p < .0001$); willingness to hire the applicant ($\omega^2 = .168$, $p < .0001$); personal liking for the applicant ($\omega^2 = .0835$, $p = .0038$); and ratings of overall qualifications ($\omega^2 = .565$, $p < .0001$). On each of these variables, the candidate with a good application was evaluated more favorably than was the candidate with a poor application. The mean response of the no-application control group was intermediate to the two experimental groups (see Table 1).

Discussion

Consistent with past research (Huguenard et al., 1970; Latham et al., 1975; Springbett, 1958; Tucker & Rowe, 1979), observers' postinterview evaluations of applicants conformed to the level of qualifications depicted in the applicants' paper credentials. The biasing effects of the application on postinterview evaluations were accompanied by biases in the recall of information from the interview, in trait and behavioral descriptions of the interviewees' performances in the interview, and in the ratings of the interviewees' overall performance in the interviews. The findings supported the hypothesis that observers of an interview tend to assimilate their perceptions of the interviewee's performance in the interview to their impressions of the interviewee's paper credentials (Dipboye, 1982; Springbett, 1958).

The differences in the descriptions of the same interviewee by observers given different levels of application qualifications were often striking. For instance, when associated with a good application, one of the interviewees was described as alert, enthusiastic, responsible, well educated, intelligent, can express himself well, organized, well rounded, can converse well, hard worker, reliable, fairly experienced, and generally capable of handling himself well. When presented along with a poor application, the same interviewee was described as nervous, quick to object to the interviewer's assumptions, and doesn't have enough self-confidence. Similarly, in the checklist descriptions of the candidates, observers were less likely to describe an interviewee with poor credentials as well groomed, as expressing his ideas

well, or as cooperative, dependable, trustworthy, thoughtful, conscientious, friendly, intellectually mature, and enterprising in the interview task.

Simply changing the order of presentation did not appear effective in reducing the biasing effects of the application. This suggests that the application's effects on the search and retrieval of information from the interview does not result exclusively from biased encoding of information at the time the interview is observed. Indeed, the lack of an order effect may indicate that the application influenced the search and retrieval of information primarily at the time the observers were making their final evaluations.

Experiment 2

Two questions raised by the findings of the first study led to a second experiment. One question was whether the biasing effects of the application were limited to situations such as in the first study, in which the interview was relatively ambiguous compared to the application, or if these findings were generalizable to situations in which the interview was unambiguous. One position, suggested by research on contrast effects, was that a moderate or ambiguous level of performance was more likely to be assimilated to prior impressions than more extreme performances (Wexley et al., 1973; Wexley et al., 1972). Another issue explored in this second experiment was whether raters would be less accurate in recalling information from the interview when they have access to applications than when they have no access. Unlike the first experiment, in which the responses to recall and recognition tasks could be evaluated on favorability but not accuracy, the second experiment contained accuracy measures and provided a test of the prediction that observers with applications would be less accurate in their recall of information than observers without applications.

Method

Overview of the Experimental Design. Subjects in the experimental conditions evaluated one applicant for a sales job on the basis of a script from the interview with that candidate and an application. The experimental design was a 3×3 between-groups factorial with application qualifications constituting one fixed effect factor (poor, good, no-application control) and the interviewee's performance in the interview (poor, mixed, good) constituting the other fixed effect factor.

Procedure. Subjects were 99 undergraduates at Rice University enrolled in psychology courses who participated in groups of 3 to 10 for extra course credit. Subjects were given essentially the same cover story and job description as used in Experiment 1 and were instructed to evaluate a candidate for the job of salesperson. To manipulate application qualifications of the candidate, subjects in the experimental groups were given either a good application (g.p.a. of 3.95, two previous sales jobs, marketing major,

favorable references) or a poor application (g.p.a. of 1.91, one previous sales job, an elementary education major, and mediocre recommendations). Subjects in the control group were not given application materials; they evaluated the candidate solely on the basis of the interview.

The interviewee's performance in answering the questions of the interviewer was manipulated in written scripts of an interview (Dipboye & Wiley, 1977). Scripts rather than videotaped interviews were used to provide the tighter control needed over the stimulus materials to examine accuracy of recall and to explore the generalizability of the findings of the first experiment to different procedures and stimuli. In all three scripts, the interviewee was asked essentially the same questions by the interviewer and provided the same information in response to the questions. However, the style with which the interviewee answered the questions was varied so that in the good interview the applicant was highly responsive, elaborated on his answers without being coaxed, and appeared self-confident, poised, and prepared. In the poor interview, the applicant was unresponsive, had to be coaxed by the interviewer to provide complete answers, and appeared nervous, lacking in confidence, hesitant, and unprepared. In the mixed interview, half the responses were taken from the poor interview and half were taken from the good interview. The information in the scripts and the applications did not overlap.

Dependent Measures. Subjects were first presented with the application, followed by the script of the interview, and finally the dependent measures. The same questionnaire items used in the first experiment were used in this second experiment (see Table 2). Subjects also were presented with a booklet that listed each of the questions asked by the interviewer in the scripts, and they were asked to restate briefly the applicants' answers to the questions. Two trained raters evaluated the accuracy of the answers to each question on a 4-point scale (1 = totally incorrect or failure to recall anything; 2 = incomplete and partially correct; 3 = incomplete, but correct; 4 = complete and correct), and the ratings for each subject were averaged across all the questions. The correlation of the averaged ratings of the two raters was .80. The raters also counted the number of items recalled correctly, and the interrater reliability on this measure was .88.

Results

Analysis of the Manipulation Checks. A 3×3 ANOVA performed on responses to checks on the success of the application qualifications manipulation revealed only significant main effects for the applications qualifications manipulation. In support of the manipulation, the poor application candidate was evaluated as having poorer job experience ($\omega^2 = .335$, $p < .0001$), a poorer academic record ($\omega^2 = .827$, $p < .0001$); less relevant education and training ($\omega^2 = .704$, $p < .0001$); and poorer recommendations ($\omega^2 = .879$, $p < .0001$) than the good application candidates. On ratings of job experience and education/training the no-application control

Table 2
Means for Manipulation Checks and Dependent Measures
for Experimental Conditions

	Application Qualifications				Interview Performance			
	Poor	None	Good	F*	Poor	Mixed	Good	F*
1. How well do you think this candidate's experience fits the job?	3.75 ^a	5.46 ^b	6.74 ^c	25.95	5.16 ^a	4.94 ^a	5.65 ^a	1.63
2. How would you evaluate the applicant's academic record?	2.81 ^a		8.48 ^b	233.34	5.77 ^a	5.69 ^a	5.41 ^a	.58
3. How well do you think this candidate's education and training fits this job?	3.06 ^a	5.84 ^b	7.81 ^c	112.04	5.48 ^a	5.33 ^a	5.53 ^a	.25
4. How would you evaluate the candidate's qualifications for the job on the basis of the references?	1.58 ^a		8.45 ^b	304.99	5.08 ^a	4.63 ^a	4.81 ^a	.37
5. How good of a job did the candidate do in answering the interviewer's questions?	3.80 ^a	4.28 ^{ab}	4.77 ^b	4.57	1.90 ^a	3.33 ^b	7.53 ^c	126.02
6. How would you evaluate the candidate's qualifications for the job?	3.33 ^a	5.34 ^b	6.84 ^c	36.24	4.77 ^b	4.38 ^b	6.15 ^a	10.1
7. Would you invite this candidate to visit your company for a second interview?	3.83 ^a	5.53 ^b	6.81 ^c	17.10	4.71 ^b	4.50 ^b	6.81 ^a	12.58
8. Would you hire this person?	3.71 ^a	4.78 ^b	6.71 ^c	17.78	4.17 ^b	4.53 ^b	6.34 ^a	10.79
9. How much would you personally like this candidate?	5.25 ^a	5.13 ^a	6.07 ^a	2.24	4.74 ^a	5.53 ^{ab}	6.09 ^b	4.25
10. Average rated accuracy of recall of interviewee's answers	2.88 ^a	3.04 ^b	2.81 ^a	5.87	2.84 ^a	2.99 ^a	2.91 ^a	2.51
11. Average number of items recalled correctly on each question	1.46 ^a	1.61 ^b	1.37 ^a	7.57	1.39 ^a	1.49 ^{ab}	1.57 ^b	4.23

*Duncan multiple range tests were performed to compare the means for the main effects. Those not having common superscripts (a, b, c) significantly differed ($p < .05$). The df 's for all F -tests except those on items 2 and 4 were 2,90. On items 2 and 4, the df 's were 1,61.

had ratings intermediate to the low and high qualifications groups. In support of the interview performance manipulation, a highly significant main effect was found for interview performance on ratings of how well the candidate did in answering the interviewer's questions ($\omega^2 = .709$, $p < .0001$). As expected, subjects in the good interview condition gave higher ratings to the interviewee than did subjects in the mixed condition who, in turn, gave higher ratings than did subjects in the poor interview condition.

Analysis of the Dependent Measures. A preliminary multivariate ANOVA was performed on the major dependent measures, excluding the manipulation check items. This factorial analysis yielded a highly significant multivariate main effect for application qualifications [Wilks $\lambda = .0748$, Rao's $F(18,126) = 18.58$, $p < .01$] and for interview performance [Wilks $\lambda = .2412$, Rao's $F(18,126) = 7.25$, $p < .01$]. A 3×3 univariate ANOVA was conducted on responses to each measure to interpret these multivariate effects, and the effects of these analyses are summarized in Table 2. A main effect for application qualifications indicated that subjects in the no-application control were rated as more accurate in their recall of answers than either the

poor or good application groups ($\omega^2 = .0929$, $p = .0041$). Also, the no-application group recalled more items correctly than did either the poor or good application groups ($\omega^2 = .1186$, $p = .0009$). In addition to the application main effect, there was a main effect for interview performance in which the poor interview group recalled fewer answers correctly than the mixed and good interview groups ($\omega^2 = .0583$, $p = .0178$).

Main effects were found for application qualifications on the ratings of overall qualifications ($\omega^2 = .376$, $p < .0001$); willingness to invite for a second interview ($\omega^2 = .204$, $p < .0001$); willingness to hire ($\omega^2 = .221$, $p < .0001$); and the performance of the interviewee in answering the interviewer's questions ($\omega^2 = .0148$, $p = .0129$). Main effects also were found for interview performance on ratings of overall qualifications ($\omega^2 = .0991$, $p < .0001$); willingness to invite for a second interview ($\omega^2 = .073$, $p < .0001$), willingness to hire ($\omega^2 = .129$, $p < .0001$); and the performance of the interviewee in answering the interviewer's questions ($\omega^2 = .709$, $p < .0001$). The ratings were in the expected direction for both main effects. Post hoc comparisons indicated that the interview performance main effect was due primarily to the significantly higher ratings given in the good performance condition relative to the other two conditions. The poor and mixed performance conditions did not significantly differ on most of the variables. In the analysis of responses to the personal liking item, only a main effect for interview performance was found ($\omega^2 = .0595$, $p = .0172$). The poor performance candidate was liked less than the mixed performance candidate, who, in turn, was liked less than the good performance candidate.

Discussion

Consistent with the findings of Experiment 1, the qualifications of the candidate depicted in paper credentials influenced the evaluation of the interview performance and the recall of information from the interview. In support of these predictions, the presence of an application had the effect of reducing the accuracy with which the observers recalled information from the interview. Furthermore, the findings of Experiment 1 do not seem limited to ambiguous interview performances. Interviewees who had good applications were rated as having done a better job in answering the interviewer's questions than interviewees having poor applications, independent of their level of overall performance in the interview. Furthermore, contrary to findings of Carlson (1971) and Bolster and Springbett (1961), subjects did not appear to "overreact" to information that disconfirmed their initial impressions by radically changing these initial impressions in the direction of the disconfirming evidence.

Although application qualifications affected evaluation of the interviewee's performance in the expected direction, evaluations of the application credentials (i.e., academic performance, recommendations, education/training, work experience) were not affected by the level of performance in the interview. This is consistent with Springbett's hypothesis that

it is the application that "provides a clearcut framework into which subsequent rather ambiguous information can be assimilated" (1958, p. 20). Even when the interview performance is unambiguously good or bad, the interviewer still must decide the extent to which the performance of the interviewee is a reaction to the situation or evidence of stable traits related to the job. Moreover, much of the information presented in the application can be checked for accuracy (e.g., g.p.a., job experience, recommendations), whereas much of the information gleaned from the interview (e.g., statements of interest in the job) often is of uncertain validity and much more difficult to verify. Given the ambiguities inherent in interpreting interview performances, the interviewer may use a trait concept or schema made salient by the application to encode and/or retrieve information from the interview.

Conclusions

The present research replicates past findings that the application biases postinterview impressions (Huguenard et al., 1970; Latham et al., 1975; Springbett, 1958; Tucker & Rowe, 1979) and shows that biases in the recall of information from the interview and the evaluation of the interview mediate these effects. In addition to providing support for one prediction posed in a model recently presented by Dipboye (1982), the present findings also have several potentially important implications for future research and practice. Past research suggests that interviewers should concentrate on assessing social skills, motivation, and personality of the applicant (Grant & Bray, 1969; Jackson, Peacock, & Holden, 1982; Landy, 1976; Ulrich & Trumbo, 1965); follow a structured interview format (Carlson, Schwab, & Henneman, 1970; Schwab & Henneman, 1969); base their interview questions on systematic job analyses (Latham et al., 1980); and evaluate applicants against job requirements (Langdale & Weitz, 1973; Wiener & Schneiderman, 1974). Although these practices appear to improve the validity and/or reliability of interviewer judgments, the present findings suggest that they may do little to increase the functional utility of the interview if paper credentials bias the information that interviewers glean from the interview. One obvious solution, which professional interviewers are likely to resist, is to interview candidates and evaluate their performance in the interview before examining paper credentials. A more realistic solution, which should be assessed in future research, is to train interviewers to form hypotheses on the basis of paper credentials and use the interview to test these hypotheses. Future research also should determine if the recall of information from the interview is organized around a specific schema of the job or if it represents a more general halo bias in which interviewers favorably impressed with the application recall favorable information and fail to recall unfavorable information regardless of the fit to the schema. Another implication of these findings for future research is that researchers need to distinguish more clearly the assessment of paper credentials, such as typically occurs

before the interview, from the face-to-face interview itself and the integration of information that occurs after the interview.

There are several potential limitations on generalizing these findings. Whether the biasing effects of paper credentials found in this research with observers generalize to face-to-face interviews remains to be assessed. Also, caution must be used in extrapolating these findings to professional interviewers, despite the repeated failure to find major differences between college students and interviewers in their judgments of applications (Bernstein, Hakel, & Harlan, 1975; Dipboye, Fromkin, & Wiback, 1975; Jackson et al., 1980). Nevertheless, the findings of these studies generally support the predictions and encourage further testing and development of the model (Dipboye, 1982).

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The Impact of Work Environment, Instrumentality Beliefs, Perceived Labor Union Image, and Subjective Norms on Union Voting Intentions¹

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A model of the unionization process is proposed, tested, and generally supported. The constructs of work environment, instrumentality beliefs, and labor union image are hypothesized as trigger, augmentor, and veto influences, respectively, of pro union voting intentions. In addition, the role of referent others is hypothesized to be a determinant of pro union voting intention.

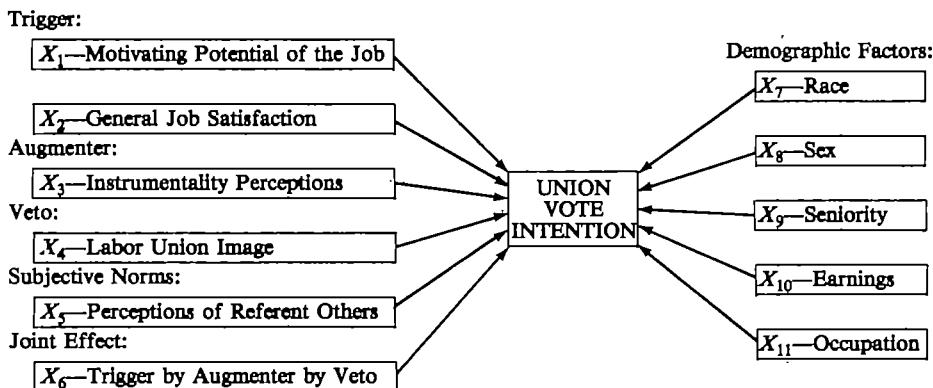
The appeal of unions to U.S. workers has received considerable attention recently in the fields of management (Brief & Rude, 1981), psychology (Gordon & Nurick, 1981), and industrial relations (Cooke, 1983; Fiorito & Greer, 1982). The study of the unionization process at the individual level of analysis has undergone an evolution. Early studies examined the process in economic terms (Bakke, 1948; Tannenbaum, 1965). Later, behavioral science studies began to emphasize the role of individual needs and motivation as critical variables in the decision process to join a union (Uphoff

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& Dunnette, 1956). Within the past five years a number of researchers have focused on the role of attitudes and perceptions toward unions, voting intentions, union voting behavior, and union membership. (See, for example, Brett, 1980; Brett & Hammer, 1982; DeCotiis & LeLouarn, 1981; Getman, Goldberg, & Herman, 1976; Gordon, Philpot, Burt, Thompson, & Spiller, 1980; Hamner & Smith, 1978; Kochan, 1979; Schriesheim, 1978.) In general, these recent studies, when considered together, are beginning to reveal a consistent pattern of relationships between pro union attitudes and behavior and attitudes toward the job, attitudes toward unions, and beliefs that unions can be instrumental in obtaining desired outcomes.

The purpose of the present study is to test an integrative model of union voting intention that simultaneously examines several key constructs of the unionization process. These variables are work environment, union instrumentality perceptions, union image, and subjective norms. A second purpose of this study is to test the proposed model of pro union attitudes for a relatively unexplored group of employees: southern workers from right-to-work states with a historically low percentage of unionization. Figure 1 illustrates the model of union voting intentions that guided the present research.

Figure 1
Model of Union Voting Intentions



In the proposed model four key constructs—trigger, augmenter, veto, and subjective norms—along with demographic factors are hypothesized to influence vote intention. The trigger, augmenter, and veto factors are hypothesized as both additive and nonadditive (x_6 = joint effect) causes of vote intention. Before testing this model, however, a discussion of the rationale for the inclusion of these variables is warranted. A number of previous studies have found relations among both affective and cognitive dimensions of the work environment and voting against a union. For example, Stampolis (1958), LeLouarn (1979), Herman (1973), and Schriesheim (1978) have reported significant relations between satisfaction with work, wages,

and working conditions and union voting behavior. Similarly, from a cognitive perspective Duncan and Stafford (1980) found that jobs low in autonomy and skills used and high in machine pacing were more likely to be unionized. Moreover, Kochan (1979) found that for white collar workers dissatisfaction with task related factors was correlated with pro union vote intent. Thus, certain task factors may operate to influence voting behavior either directly or indirectly through the worker's perceived dissatisfaction with various features of the work environment.

In the present study work environment is operationalized such that both the cognitive and affective aspects are captured as independent triggering mechanisms of a pro union vote intent. Drawing on the job design literature (Hackman & Oldham, 1974), the worker's perception of key task factors or job scope (as reflected in the motivating potential score associated with the job) is hypothesized to trigger a pro union vote intent. Jobs that are low in motivating potential should evoke a more positive union vote intention. Similarly, in terms of affect, workers who express less satisfaction with various facets of the work environment (pay, security, supervision, and so forth) are predicted to express higher intentions to vote for a union. This conceptualization explicitly recognizes that although a worker may be satisfied with some features of the work environment such as the job itself or co-workers, dissatisfaction with other features, such as supervision, may still serve to trigger a pro union vote intention.

The notion of the work environment as a trigger mechanism, however, is not without conceptual difficulty. As an explanation of individual level vote intention, it is unclear whether all employees, for example, are receptive to unionization attempts at similar levels of perceived low job scope or job satisfaction. If a threshold does exist, the determinants of this threshold may differ across workers. Finally, although behavioral approaches to the unionization process are distinctly oriented to the individual as the unit of analysis, successful unionization requires the support of a group of employees. Whether 10 percent versus 50 percent of the workers must be dissatisfied with the environment before a union is viewed as a viable alternative is unclear. Other things equal, though, it could be hypothesized that the greater the dissatisfaction with the work environment, the more susceptible the worker is to unionization attempts.

Several researchers (Brett, 1980; DeCotiis & LeLouarn, 1981; Kochan, 1979), drawing on premises explicit in expectancy theory, have suggested that workers will intend to vote for a union if they not only are dissatisfied with the work environment, but *also* believe that the union will be instrumental in improving conditions of work in cases in which management has been unresponsive or noninstrumental. Dissatisfaction with the work environment in terms of critical job perceptions or general job dissatisfaction, therefore, can trigger or arouse interest in union representation, but will not necessarily result in pro union voting intention.

Instrumentality perceptions of the union are hypothesized to *augment* pro union voting intentions. That is, dissatisfaction alone will not account totally for why workers seek union representation. An employee who is

dissatisfied with the work environment, but who *also* perceives the union as an instrumental vehicle for changing various aspects of the job will be more likely to exhibit a pro union vote intention. The role of instrumentality perceptions on voting intentions, as depicted in Figure 1, therefore is both additive and nonadditive through the hypothesized joint effect with the work environment perceptions and labor union image (that is, the interaction effect, x_d).

A third critical variable in the proposed model of union voting intentions is the worker's perceptions of the union. The image of the labor union is hypothesized as a *veto* influence on union voting intentions, even though the worker may be dissatisfied with the work environment and/or perceive that unions could be instrumental in the achievement of desired outcomes. How one acquires either a positive or negative impression of labor unions is not completely understood. Gordon and Nurick (1981), using the Katz and Kahn (1978) formulation of organizational role making processes, suggest that the union can communicate role expectations to either current or potential members. Yet, workers can and do form images of organized labor without experiencing union organizing campaigns. The question of how labor union image is acquired, whether by role making processes within the union, the employing organization, or the community in which the worker resides, or perhaps by other sources, is beyond the scope of this study. Nevertheless, in the present study perceived labor union image is hypothesized as a veto influence through its direct effect on voting intention. An employee who is dissatisfied with the work environment, or who has a high union instrumentality belief and who would otherwise vote for a union, will not do so when labor union image is viewed negatively.

A fourth factor hypothesized to exert an influence on the unionization process is subjective norms. As described by Fishbein (1967) and applied by Brief and Rude (1981) to the unionization process, subjective norms reflect the employee's perceived expectations of salient others and the motivation to comply with those norms. In other words, a worker may not intend to vote for a union, despite dissatisfaction with the work environment and high perceived instrumentality, because referent others do not intend to support a union. Referent or salient others may be co-workers, family members, or community leaders, for example. As such, these individuals can communicate their expectations to others. Similar to an unfavorable labor union image, subjective norms are hypothesized to operate through the worker's perception of referent others' nonsupport for union representation and, in turn, reduce the worker's intention to vote for a union.

Finally, the model suggests that workers may intend to support a union only when the trigger, augmentor, and veto conditions are jointly met. That is, a four-way interaction among motivating potential, job satisfaction, union instrumentality beliefs, and labor union image is hypothesized such that, for workers to express pro union voting intentions, they must perceive low motivating potential in their work, be dissatisfied, perceive unions as instrumental, *and* not hold a negative image of labor unions in general.

In summary, a model of the unionization process is proposed that examines four key determinants of pro union voting intentions: (1) the *trigger* effect of the work environment through the motivating potential of the work and job satisfaction; (2) the *augmenter* effect of high union instrumentality beliefs; (3) the *veto* effect of an unfavorably perceived labor union image; and (4) the role of *subjective norms* on individual vote intentions. Although previous writers have suggested that the unionization process may vary because of such individual differences as wage level, seniority, race, sex, or occupational status (see, for example, Blinder, 1972; Farber & Saks, 1980; Kochan, 1979), the proposed model is hypothesized to operate similarly regardless of differences in these factors. Individual differences, such as race, may account for observed differences in the *levels* of key variables in the model, but the underlying psychological *process* is predicted to generalize over subgroups of workers. Nonwhite or female workers, for example, may perceive a higher degree of union instrumentality for achievement of economic benefits (improved wages) because these groups generally earn less than white or male workers, respectively. Econometric studies of the effects of unions on wages show that unions on average increase wages and lower dispersion in earnings (Freeman, 1982; Lewis, 1963). Therefore, lower wage workers (i.e., blacks and females) will perceive the union as more instrumental for obtaining increased wages. For these reasons individual differences resulting from wages, seniority, or occupational status, rather than race or sex per se, are hypothesized to influence pro union vote intention.

A final issue addressed by the present study concerns the so-called "southern effect" of worker resistance to unionization attempts. The available evidence in support of the relationship between worker's attitudes and perceptions and union vote intentions and behavior has come primarily from studies conducted in nonsouthern states (Getman et al., 1976; Hamner & Smith, 1978; Schriesheim, 1978). Using the quality of employment survey data, Kochan's (1979) analysis found that when other environmental factors were controlled, the "southern effect" disappeared. Because the present study was conducted with employees drawn from two southern right-to-work states, the proposed model of union voting intentions can be subjected to a critical test. Thus, although previous research offers partial support for some of the components in the proposed model, no studies have empirically tested the kind of model suggested by Brett (1980)—an integrative model that assesses the impact of the work environment, perceived union instrumentality, perceived labor union image, and subjective norms on union voting intentions.

Method

Sample Selection and Characteristics

The sample consisted of members of a consumer panel who are regularly surveyed for their views on a number of topics. The sample, drawn from

two southeastern states, is a representative cross-section (according to the geographic distribution of the population) of people with a median household income greater than \$6,000 annually (the average annual income for the study sample was \$17,283). Of the total panel of 1,200 people, 740 questionnaires were returned (62 percent of the panel). Of the 740 respondents, 62 (8.4 percent) were removed who currently belonged to a union, and another 287 were removed who listed their occupations as doctors, lawyers, engineers, or managers. These latter subjects were removed because of the lack of opportunity to organize. Of the final study sample of 400 respondents, 53 percent were male, 11 percent were nonwhite, 26 percent were in blue collar occupations, and company seniority averaged 13 years. All respondents completed identical questionnaires described below.

Measures

Dependent Variables. Three different aspects of union voting intentions were assessed using a 3-point Likert scale (1 = no, 2 = uncertain, and 3 = yes). One questionnaire item asked if the person would be willing to sign an authorization card to allow a union certification election (19 percent yes, 51 percent no). A second item asked if the person would vote for a union if given the opportunity (15 percent yes, 56 percent no). A third item asked if the person would vote to decertify a union if given the chance (44 percent yes, 38 percent no). The third item was reverse-scored for all analyses such that higher scores indicated stronger union voting intentions. These three items were added to form a summary union voting intention index (internal consistency estimate was .89).

Independent Variables. A number of survey items were used to assess the independent variables of motivating potential, job satisfaction, union instrumentality, perceived labor union image, and the demographic factors of race, sex, occupational status, wage, and seniority level.

Motivation potential: An additive composite index was constructed from the Job Diagnostic Survey (JDS) (Hackman & Oldham, 1974) items that measured the perceived job dimensions of skill variety, autonomy, feedback from the job, task identity, and task significance (motivating potential score). Each survey item was assessed with a 7-point scale, and the internal consistency reliability estimate of the composite index was .82.

Job satisfaction: Similar to the motivating potential variable, an additive composite was formed of the 17 JDS short form items used to measure job, pay, security, social, supervision, and growth facet satisfaction. The items were assessed using a 7-point scale and yielded an internal consistency reliability estimate of .92.

Union instrumentality beliefs: Respondents were asked to indicate the extent to which they agreed or disagreed (using 5-point scales) that a labor union on their job would result in a greater probability of occurrence of 20 outcomes: increased wages, improved benefits, protection from being fired, creation of new jobs, being charged excessive dues (reverse-scored),

increased work disruptions (reverse-scored), strikes (reverse-scored), fewer promotions (reverse-scored), work stoppages (reverse-scored), cause employer to relocate (reverse-scored), improved work hours, improved productivity, improved working conditions, fairness of treatment, employee-management friction (reverse-scored), fewer accidents, more interesting work, easier handling of grievances, improved health environment, and increased number of grievances (reverse-scored). An additive composite of the 20 items was used to form a single measure of union instrumentality (internal consistency was .93).

Labor union image: Union image was measured by four items dealing with general attitudes towards unions. Respondents were asked to indicate the extent to which they agreed or disagreed (using 5-point scales) with statements describing unions as corrupt, too strong, not adequately representing women, and unnecessary, given current laws. An additive composite was used to form a single measure with an internal consistency reliability estimate of .77. The entire index was scaled such that higher scores reflected a more positive image of labor unions.

Subjective norms: To assess a worker's beliefs of how referent others would vote in a union representation election, three items were summed into a single index. Each item was scaled on a 3-point basis (1 = no, 2 = uncertain, 3 = yes). The items were: Do you think your co-workers would favor a union; did either of your parents belong to a union; and do any of your other relatives belong to a union? This composite yielded a disappointingly low internal consistency estimate of .37.

Demographic factors: A variety of questions were used to assess the race, sex, occupational status, current wage/earnings, and seniority levels of the respondents. Occupational status was determined from the Census Bureau index of occupations. Census codes 1 through 396 were coded white collar, all others blue collar. Race (white/nonwhite), sex (male/female), and occupational status (white versus blue collar) were coded as categorical variables; current wages/earnings and seniority were treated as continuous variables.

Analytical Strategy

Given the model proposed in Figure 1, a path analytic approach was selected to test the proposed linkages (Blalock, 1971; James, Mulaik, & Brett, 1982). Although the factors depicted in Figure 1 may be causally related (that is, direct and indirect influences on union vote intention are present), meeting the assumptions of causal analysis to test such a model was beyond the scope of this study (James et al., 1982; Pfaffenberger, 1979). Because only direct relations are tested (consistent with Figure 1), a multiple regression analysis was conducted to estimate the path coefficients associated with Figure 1. Although nonadditive terms are viewed as complications to path analytic approaches, the 4-way interaction proposed in Figure 1 was deemed

necessary because of theoretical considerations. To reduce the multicollinearity between the trigger, augmenter, and veto variables and the joint effect, the means of the first four variables, respectively, were subtracted from each observation in the computation of the cross product term for the joint effect (Althauser, 1971). For Figure 1, the interaction term was assessed consistent with moderated regression analysis to assess its incremental contribution to the explanation of union vote intention.

Results

Bivariate correlations as well as means, standard deviations, and reliability estimates for the study measures are presented in Table 1. The zero-order correlations among the trigger, augmenter, veto, and subjective norms variables and pro union vote intention are in the predicted direction and are significant. The transformed measure of the joint effect of the trigger, augmenter, and veto influences, however, is not significantly correlated with vote intention. Three of the five demographic variables—sex, race, and wage—exhibit significant correlations with union vote intention.

To estimate the direct effects of the hypothesized influences of union vote intention depicted in Figure 1, path coefficients were estimated and are presented in Table 2. In terms of the four key constructs hypothesizing union vote intention, only the path coefficients for the triggering effects of motivating potential of the job and job satisfaction failed to reach significance. Among the three significant path coefficients, the subjective norms variable exhibited the largest path, which was nearly double the magnitude of the instrumentality and labor union image coefficients. Given the nonsignificant path coefficient for the joint effect term, the hypothesized veto effect of labor union image appears to operate more as a main effect than as an interactive influence on pro union vote intention. Finally, of the five demographic factors, only seniority exhibited a significant, positive path coefficient. Although previous studies would suggest a negative relationship between seniority and vote intention, the positive coefficient observed here may reflect the peculiar nature of this nonunion southeastern sample. Overall, though, the remaining insignificant path coefficients would suggest that demographic factors exert an *indirect* rather than a direct influence on union vote intention. Although indirect effects could not be assessed in this study, presumably the demographic effects operate through the hypothesized trigger, augmenter, veto, and subjective norms mechanisms.

Discussion

Several important conclusions can be drawn from the results of the present study. First, the relationship between job attitudes and pro union vote intention is complex. Given the nonsignificant path coefficients for the work environment variables, dissatisfied workers may not necessarily seek

Table 1
Means, Standard Deviations, Reliabilities, Bivariate Correlations
Among Dependent and Independent Variables^a

Variables	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11
<i>Dependent</i>												
1. Summary Vote Intention Index	.89 5.04 (2.02)											
<i>Independent</i>												
2. Sex (1 = male, 2 = female)	n.a. 47.4 ^c	16										
3. Race (1 = nonwhite, 2 = white)	n.a. 10.8 ^d	-25	17									
4. Wage (earnings per year)	n.a. 17439.88 (11602.22)	-17	-45	10								
5. Seniority (years)	n.a. 13.59 (10.00)	05	-22	-01	21							
6. Occupational status (0 = white collar, 1 = blue)	n.a. 26.3 ^e	-01	-26	-06	-02	20						
7. Motivating potential score	.82 85.60 (12.60)	-14	-14	07	26	09	-03					
8. Job satisfaction	.92 92.84 (16.64)	-32	-03	09	18	14	02	54				
9. Instrumentality beliefs	.93 54.79 (13.82)	73	26	-27	-23	-07	-10	-25	-43			
10. Labor union image	.77 11.07 (3.27)	60	13	-25	-13	03	-07	-09	-23	67		
11. Subjective norms index	.37 4.96 (1.60)	33	05	-05	-13	-11	-04	-06	-11	28	25	
12. Joint effect	n.a. 5178.91 (21431.74)	07	16	-08	00	-06	-07	-18	-16	06	04	09

^aDecimals have been omitted from correlations. Number of observations 303. Correlations equal to or greater than .11 and .14 are significant at the .05 and .01 levels, respectively.

^bReliabilities are Cronbach coefficient alpha estimates of internal consistency.

^cPercent female.

^dPercent nonwhite.

^ePercent blue collar.

Table 2
Multiple Regression Estimates of Path Coefficients

<i>Independent Variables</i>	<i>Dependent Variable: Union Vote Intention Beta^a</i>	<i>SE^b</i>
<i>Trigger</i>		
Motivating potential	.01	.01
Job satisfaction	-.01	.01
<i>Augmenter</i>		
Instrumentality perceptions	.08**	.01
<i>Veto</i>		
Labor union image	.11**	.03
<i>Subjective norms</i>		
Perceptions of referent others	.17**	.05
<i>Joint effect</i>		
Trigger \times augmenter \times veto	.00 ^c	.00 ^c
<i>Demographic</i>		
Sex	.08	.19
Race	-.29	.28
Wage	.00 ^c	.00 ^c
Seniority	.02**	.01
Occupational status	.24	.19
Multiple R	.76	
Adjusted R ²	.57	
Overall F	36.81**	
Sample N	303	

^aStandardized regression (path) coefficient.

^bStandardized error of beta.

^cLess than .00001.

* $p < .05$

** $p < .01$

unionization as a means to redress job problems. The hypothesized augmenter, veto, and subjective norms effects, however, did exhibit a significant influence on pro union voting intentions. This study, therefore, has demonstrated clear empirical support for three important determinants of pro union voting intentions: instrumentality beliefs, labor union image, and subjective norms. Second, contrary to conventional wisdom, demographic factors per se, such as being nonwhite or female, do not necessarily predispose some workers to support unionization. These study findings would argue that perhaps demographic influences are exerted only indirectly through the augmenter, veto, or subjective norms effects on pro union vote intention. Third, an integrative model of *pro union* vote intention has been validated for a sample of nonunion southern workers who generally have been unresearched by previous industrial relations studies of the unionization process.

In some respects these study findings corroborate Kochan's (1979) results; in other respects they do not. Although only 15 percent of this study's nonunion sample indicated that they would vote for a union (33 percent in Kochan's study), both studies supported the consistent influence of instrumentality perceptions on pro union voting intentions. Unlike Kochan's study, the present study found very little support for the direct effect of demographic variables, especially race, on pro union voting intentions. Although the multivariate results of this study did not support the Kochan

finding of the triggering effect of job satisfaction on pro union vote intention, the present study findings may be conservative, given the limited sample size and the multicollinearity among the trigger variables and the other variables in the model. The zero-order correlation for job satisfaction with vote intention ($-.32$), however, was similar in magnitude to those obtained by Kochan (for example, bread and butter satisfaction, $-.30$; supervision, $-.21$; nature of work, $-.30$). Importantly, though, instrumentality perceptions were significant predictors of vote intention in both Kochan's study and in the present study. Although Kochan inferred a joint effect of dissatisfaction with working conditions, desire for influence over job conditions, and lack of other forms of influence on union vote intention, he did not conduct a direct test of this effect. In the present study, the joint effect for the trigger, augments, and veto influences on union vote intention was tested and not supported. Thus there was a direct effect influence only of the augments, veto, and subjective norms variables on pro union voting intention.

A number of limitations to the present study deserve further comment. First, although the sample of respondents was drawn from southern right-to-work states, they may not be entirely representative of all workers from the region sampled. The sample, despite the removal of professionals such as doctors, lawyers, engineers, managers, is biased toward white collar workers, probably because of the nature of the sampling frame: a consumer panel that voluntarily agreed to complete questionnaires periodically for a university research center. Restriction in range on a number of the key variables of the behavioral model may have resulted from the sampling bias.

A second limitation concerns the choice of a model to guide the research. Although it is beyond the scope of the present study, causal models can be developed that may be consistent with the data reported in this study but yet comprehensively assess indirect as well as direct influences on pro union vote intentions and behavior. Given that the proposed model was developed from prior theory and research evidence, the consistency of findings regarding the augments, veto, and subjective norms variables is encouraging. Nonetheless, alternative models of, for example, a union/company campaign (Brett & Hammer, 1982) are amenable to causal modeling and testing and will clearly advance understanding of the unionization process. The choice process, as Brett and Hammer (1982) have suggested, is complex; current beliefs about unions can serve as filters that shape the development and acquisition of future attitudes toward unions. Similarly, current membership in a union may represent an implicit or explicit choice to an individual; hence future beliefs and attitudes may be formed consistent with this implicit or explicit choice. An examination of actual voting decisions would imply longitudinal designs which, when combined with the causal model results from cross-sectional studies, can provide a more rigorous test of the proposed unionization models.

Another limitation of the present study is the conceptualization and operationalism of pro union voting intentions. The process of expressing interest

in a union (authorization), actually voting (certification), and the process of disengagement (decertification) were all contained in the composite index of union voting intention. Clearly, this is an oversimplification of the unionization process: the factors that operate prior to an election to influence actual voting behavior may differ substantially after certification when the union attempts to negotiate a contract successfully and avoid decertification. It is noted that research on the deauthorization/decertification process (Anderson, Busman, & O'Reilly, 1982; Dworkin & Extejt, 1980) suggests that the inclusion of individual level measures of attitudes toward unions, toward management, and perceived consequences for union and management contributes significantly to the prediction of decertification outcomes. The role of leadership (especially informal), salient job related issues (potential triggers), and the content of the campaign messages (union images and subjective norms) would appear to be common determinants of unionization and decertification outcomes. Further research is needed to explore how the unionization and decertification processes are similar and/or dissimilar.

Future studies of the unionization process also should address the determinants of subjective norms through the role making processes within the organization, the union, and the community in which workers reside. Although the subjective norms measure in the present study exhibited a strong path coefficient, its meaning and interpretation must be tempered by the disappointingly low internal consistency reliability coefficient observed for this measure. The study of organizational commitment (Gordon et al., 1980; Porter, Crampon, & Smith, 1976) may provide a framework for understanding the attachment process that workers undergo. The unionization process also could be viewed from a social information processing framework (Blau & Katerberg, 1982; Brett & Hammer, 1982), which may contribute to the understanding of the role of referent others in providing pro or anti union cues that, in turn, influence employee attitudes and behavior.

Given these limitations, it still is believed that a number of implications for management and union alike can be drawn from the present study. Given the pervasive influence of instrumentality beliefs, management may want to consider how personnel activities such as performance appraisal, compensation policies, grievance machinery, and discipline and discharge policies engender a sense of personal control for employees. Employees who perceive that efforts toward organizational objectives are consistently rewarded, that the compensation system equitably rewards workers in proportion to effort and ability, who feel that the grievance system provides them with a voice, and who perceive that discipline and discharge policies are administered fairly and do not threaten job security are less likely to view unions as instrumental for the improvement of wages, hours, and working conditions. Similarly, if these conditions are not present and if the work force is unorganized, accurate detection by a union can provide diagnostic information for a successful organizational campaign. Instrumentality perceptions could also guide union decisions regarding the roles to serve through the collective bargaining process.

A final issue worthy of further study is the role of union and employer actions that can potentially affect the degree of choice that a worker can exercise in a unionization campaign. In the present study, labor union image was conceived as a potential deterrent or veto influence on the choice for a union. Similarly, other conditions, such as a lack of alternative employment opportunities and employer threats or fear of employer reprisal, may effectively constrain "choice." This situation is somewhat analogous to Hirschman's (1970) exit, voice, and loyalty concept, whereby employees who are dissatisfied with working conditions view unions as instrumental for improvement and thus view unions favorably, but they are unable to exercise voice because of coercive employer actions. Although the National Labor Relations Act (NLRA) proscribes such employer behavior, Chaney's (1981) study of the National Labor Relations Board's (NLRB) reinstatement of employees terminated by their employers in violation of the NLRA section 8(a)(3) strongly suggests that employer actions can "chill" pro union attitudes and behavior. Thus, the Getman et al. (1976) finding that company campaigns do not influence vote or attitude change may not have fully taken into account the degree to which choice was constrained by prior employer actions.

In conclusion, the present study has presented compelling evidence in support of a multivariate model of the unionization process. Contrary to earlier writers who have suggested a rather simplistic view that dissatisfied workers seek union representation, the present study has identified several critical attitude constructs that operate in a complex fashion to influence pro union attitudes. Further research is needed that uses longitudinal designs and more heterogeneous samples of workers to refine and generalize the proposed model of the unionization process.

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Faculty Satisfaction with Pay and Other Job Dimensions Under Union and Nonunion Conditions

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This study examines the relationship of faculty unionism on satisfaction with pay and other job dimensions. Union faculty were more satisfied with their pay than were nonunion faculty. Other significant determinants of faculty pay satisfaction were pay level, tenure, job experience, and sex. With the exception of pay, unionization was unrelated to other dimensions of job satisfaction.

The past decade has seen an enormous increase in the number of unionized institutions in higher education. In 1969 only 24 institutions of higher education had unionized faculties. By 1979, with the exception of law and medical schools, a total of 227 institutions were unionized, representing about 86,000 professors. The vast majority of these colleges and universities were publicly owned and operated, 161 out of 227. In relative terms, about 30 percent of all public and 5 percent of all private institutions had faculty unions in 1979 (Garbarino, 1980).

Faculty unionism replaces the collegial governance system with one based on the process of collective bargaining for determining wages, hours, and conditions of employment. This significant change in employer-employee relations in vast areas of higher education has spawned an emerging body of research literature. This literature has dealt with issues such as the extent of unionization (Garbarino, 1980); union structure (Bognanno & Suntrup, 1975; Garbarino & Lawler, 1978); faculty strikes (Aussieker, 1976); faculty attitudes toward collective bargaining (Allen & Keaveny, 1981); and the relationship between faculty unionism and organizational performance (Cameron, 1982). A few studies have examined factors related to faculty interest in unionizing. Research addressing reasons for forming unions suggests that faculty members organize because of job dissatisfaction, primarily

with economic aspects of the work situation (Feuille & Blandin, 1974; Bigoness, 1978). In fact, data concerning university faculty indicate that when the effects of salary and satisfaction with pay are taken into account, other measures make virtually no contribution to explaining the felt need for a union (Allen & Keaveny, 1981). Surprisingly, little research has been done on the extent to which faculty pay satisfaction may be attributed to the presence or absence of a union. This study was designed to close this research gap by examining the impact of faculty unionism (as an independent variable) on pay satisfaction (as a dependent variable), while controlling for the effect of other correlates of pay satisfaction. Although pay satisfaction is the focal point of this paper, the relationship between faculty unionism and other job satisfaction dimensions (e.g., promotions, work content) also will be explored.

The best known model of pay satisfaction was developed by Lawler (1971). This model combines equity, social comparison, and discrepancy theory in order to explain the determinants of pay satisfaction. In this formulation, pay satisfaction results when there is a congruence between the amount of pay a person feels he/she should receive and the amount of pay he/she feels is being received. Dissatisfaction results when the amount the person receives is perceived to be less than the amount the person feels he or she should receive. The latter perception is a function of (a) perceived personal job inputs, (b) perceived job demands, (c) nonmonetary outcomes from work, and (d) pay history. The model predicts that, other things equal, a person who feels he/she has relatively high personal job inputs, a more demanding job, lower nonmonetary outcomes, and higher past earnings will feel he/she should receive a relatively high level of pay. The second component of the model, perceived amount of pay received, is said to be a function of pay level, perceived pay of referent other, and, to a lesser extent, pay history.

Empirical research generally has supported Lawler's hypothesis, although the addition of pay-system administration variables substantially improves explained variance in pay satisfaction (Dyer & Theriault, 1976; Weiner, 1980). The greater the clarity or degree of perceived understanding of criteria used to determine pay and the greater the perceived accuracy and consistency of pay decisions, the greater the reported level of pay satisfaction.

The presence of a union may alter faculty perceptions of pay satisfaction by impacting some of the determinants of pay satisfaction suggested in the Lawler model. First, the union may alter the perception of "pay received" by affecting pay level and pay history of faculty members. Although the econometric evidence on the impact of faculty unions on relative wages is unclear at this point, the belief that unions can use their bargaining strength to raise wages above the nonunion level is deeply ingrained (Mitchell, 1978). Second, the union may positively affect the perceived nonmonetary outcomes. Most unions introduce the grievance procedure as a mechanism to determine justice and increased security to the faculty. Individual faculty members may perceive this protection as a form of

nonmonetary compensation that positively affects the faculty perceptions of pay fairness. Third, the union may alter the perceptions of job demands. Faculty collective bargaining has shifted the locus of decision about the conditions of work and work expectations to the bargaining table (Birnbaum, 1980). For example, issues involving educational and research programs, distribution of scarce research funds, faculty reductions, course loads, priorities for summer teaching, intercollege or departmental budget allocations, consulting policy, and so on are in many instances discussed and formalized within the context of negotiation settings. Fourth, faculty unions are likely to have a major impact on the perceptions of pay-system administration. Faculty unions have forced personnel reviews for pay into a more systematic framework, complete with decision making criteria, and open to general scrutiny. Further, many academic contracts have provisions that permit individual faculty members to appeal adverse decisions and even to take the decision "outside" to be tried before an impartial arbitrator or panel of arbitrators.

For some faculty groups the union may have a depressing effect on pay satisfaction. In a nonunion university, Deans may have more flexibility to adjust pay levels for certain faculty groups, depending on market conditions, than Deans in unionized universities. There is some research that suggests that faculty members in fields with a "high market" demand, and facing easy access to alternative nonacademic jobs in industry, appear to have the most negative attitudes toward collective bargaining (Ladd & Lipset, 1973). Social scientists have been found to be most favorable toward collective bargaining, followed by humanists and natural scientists. Professors in the fields of business, engineering, and related applied fields have been found least receptive to professional unionism (Feuille & Blandin, 1974). In general, those in the high market groups receive higher salaries than do those in the low market groups, and they fear that they may have more to lose by the leveling effect following the introduction of collective bargaining (Bigoness, 1978). Understandably, subjects in the high market fields would be expected to be most apprehensive regarding such a prospect.

The primary purpose of the present study is to assess empirically the relationship between the presence or absence of a faculty union and the level of faculty pay satisfaction, while controlling for other correlates of pay satisfaction identified in the literature. The control variables included in the study are present salary (Bigoness, 1978; Dyer & Theriault, 1976); sex (Sausser & York, 1978); age (Dreher, 1981); years of experience (Ronan & Organt, 1973), and tenure (Allen & Keaveny, 1981).

This study also explores the extent to which faculty unions may have an effect on other job satisfaction dimensions. Kochan and Helfman (1981) found that among hourly workers union members were more satisfied with their pay, but less satisfied with supervision, promotion opportunities, job content, job context, and adequacy of resources. These authors advanced the hypothesis that unionized workers may trade off higher satisfaction

with "bread and butter" issues in exchange for reduced satisfaction with other dimensions of their jobs.

In summary, the research questions being asked here are: (1) Does the union positively influence the level of faculty pay satisfaction? (2) Are there greater differences in pay satisfaction between "high" and "low" market faculty groups under union versus nonunion conditions? (3) What factors moderate the relationship between the presence of a faculty union and pay satisfaction? (4) Do faculty unions exhibit a differential impact on pay satisfaction versus other dimensions of job satisfaction?

Method

Research Site

The research site selected for this study consisted of a union university system (Minnesota) and a nonunion university system (Wisconsin) in the upper midwest region. These locations were chosen for a variety of reasons. First, the institutional characteristics of the campuses were closely matched. The union system is the Minnesota State College system, which is organized by the National Education Association (NEA). The nonunion schools consisted of the regional university cluster campuses of the University of Wisconsin system. Three campuses of each of these university systems were chosen for the study (Mankato, Bemidji, and St. Cloud for the Minnesota system; Eau Claire, La Crosse, and Oshkosh for the Wisconsin system). All campuses in the study were four-year degree granting public sector institutions at which teaching is the primary emphasis. This is an important element affecting the generalizability of the study because faculty unions are almost exclusively associated with four-year "teaching" schools (Davey, Bognanno, & Estenson, 1982). Second, the locations were highly comparable for the selected schools. All campuses were located in cities of less than 60,000 population and not adjacent to any large metropolitan areas. Cost of living, unemployment rate, and general environmental conditions also were similar. Third, both Minnesota and Wisconsin have a public sector bargaining law permitting faculty organizing. This is an important factor in choosing a research site because the level of faculty organizing activity is highly dependent on the existence of enabling labor laws (Garbarino, 1980). Fourth, the multicampus university systems in both states operate under virtually identical administrative structures. Each school is run by a president under the authority of a state-wide university board appointed by the Governor, with an administrative head (or chancellor) for all campuses. Within each campus, the college deans report to the vice-president for academic affairs, who in turn reports to the president. Direct faculty governance (e.g., through a university senate or a faculty committee structure within each campus) plays a minor role in both college systems. The close match in governance structure between both research sites is important to this study because differences in organizational characteristics may

be related to both the presence or absence of faculty unions as well as pay satisfaction. Fifth, the Minnesota system has been unionized since 1975, and four contracts had already been negotiated when the data for this study were collected. Therefore, enough time had elapsed in the Minnesota system for the effects of the union on job satisfaction to be detected.

Sample

The survey population from each school was randomly selected from the faculty listings in Liberal Arts and Business Administration. This breakdown allowed one to test for differences in pay satisfaction between "low" (Liberal Arts) and "high" (Business Administration) market groups under union and nonunion conditions. Of the 535 questionnaires distributed, 263 were returned, consisting of 140 from Liberal Arts and 123 from Business Administration. Of the respondents, 48 percent worked in the union system; the remainder were in nonunion schools. This represented an overall response rate of 49.2 percent. A comparison of the respondents and population characteristics for the six schools showed a close match in terms of sex, academic rank, tenure, educational level, and age (Table 1). There thus were few demographic differences between respondents and the faculty population of these schools.

Table 1
Summary of Demographic Characteristics
for Respondents and University Faculty Population*

<i>Demographic Characteristics</i>	<i>Respondents Sample % (N = 263)*</i>	<i>University Population %</i>
<i>Sex</i>		
Male	77.5	76.6
Female	22.5	23.4
<i>Rank</i>		
Instructor	12.1	12.0
Assistant Professor	25.0	25.3
Associate Professor	28.4	27.2
Full Professor	24.5	35.5
<i>Tenure</i>		
No	26.8	27.1
Yes	73.2	72.9
<i>Educational level</i>		
M.A. or professional degree	38.8	39.5
Ph.D.	61.2	60.5
<i>Age</i>		
Under 30	18.1	21.0
31-40	30.9	32.1
41-50	30.3	33.3
Over 50	20.7	13.6

*Sample of respondents includes 140 faculty members from Liberal Arts (English, Humanities, Social Sciences, Education, and Foreign Languages) and 123 from Business Administration (Economics, Marketing, Management, Accounting, Finance, and Computer Science).

Measures

The pay satisfaction scale consisted of nine items, five of which were selected from the pay scale of the Minnesota Satisfaction Questionnaire (MSQ) (Weiss, Dawis, England, & Lofquist, 1967). Four items were added to the MSQ pay scale to measure satisfaction with benefits, future pay expectations, cost of living adjustments, and the way pay raises are given. These four questions were included in the survey to obtain a broader measure of the pay satisfaction variable. The response format consisted of the MSQ 5-point Likert scale. The nine pay satisfaction items were factor analyzed by the principal axis method with the squared multiple correlation as the estimate of communality (Statistical Package for the Social Sciences, 1976). A plot of eigenvalues indicated one common factor exceeding the criterion of 1 (eigenvalue = 6.066, percent of common variance = 67.4%). An orthogonal varimax rotation indicated that all nine items loaded highly on a single factor, with the factor loadings ranging from .516 for "benefits" to .904 for "my present salary." A subsequent reliability analysis indicated a very high Cronbach alpha for all nine items (.94). Based on this psychometric evidence, pay satisfaction in the present study was treated as a unitary variable computed by unit weighing and adding the responses to the nine items.

In addition to pay, five other measures of job satisfaction were used in the study. These consisted of the following MSQ scales: satisfaction with promotional opportunities, supervision, job content, job context, and resource adequacy. These dimensions are identical to those utilized by Kochan and Helfman (1981) in their study of unions' effect on job satisfaction among hourly workers.

The demographic continuous data were obtained in the survey by self-report of years of seniority, years of age, years of experience, and pay level for the nine-month 1981-1982 academic year.

The responses to categorical questions were treated as dummy variables. Sex was coded one for male and zero for females. Liberal Arts was coded as one and Business Administration as zero. Tenured faculty were coded as one, and untenured faculty were coded as zero. Finally, the union variable also was dichotomized into one for union and zero for nonunion faculty.

Analysis

Three separate regression equations were calculated with pay satisfaction as the dependent variable. The first one included the entire faculty sample ($N=263$) and was designed to determine the extent to which the union coefficient was significant after controlling for the effect of other variables in the equation. The remaining two equations were calculated for the union ($N=127$) and nonunion ($N=136$) samples to ascertain whether or not the regression coefficients differed for the faculty group membership variable under union versus nonunion conditions. All regression equations

included sex, pay level, age, years of experience, and tenure as control variables. An analysis of the direct and indirect effects of the union on pay satisfaction with pay level as an intervening variable also was conducted on the entire faculty sample using the standard formula (Kerlinger & Pedhazur, 1973).

The union's impact on faculty satisfaction with promotion, supervision, job content, job context, and resource adequacy was tested via a separate regression equation against each of the corresponding MSQ scales, while controlling for pay level and other demographic characteristics. The intercorrelation matrix is given in Table 2.

Table 2
Intercorrelation Matrix
(*N* = 263)

<i>Variables</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Pay satisfaction	—												
2. Union	.25	—											
3. Faculty group	.09	-.01	—										
4. Pay level	.37	-.01	.06	—									
5. Age	.16	-.05	.31	.42	—								
6. Years experience at institution	.23	-.04	.46	.48	.61	—							
7. Tenure	.10	-.11	.38	.53	.45	.68	—						
8. Sex	-.06	-.07	-.13	.22	.04	-.01	.13	—					
9. Promotion	.55	.01	.04	.39	.17	.23	.20	.03	—				
10. Supervision	.38	.06	.03	.05	.01	.06	-.08	.02	.38	—			
11. Job content	.34	-.02	.01	.11	-.01	.06	.06	.02	.36	.46	—		
12. Resource adequacy	.40	.04	.04	.20	.12	.17	.09	.04	.35	.31	.32	—	
13. Job context	.47	-.02	-.03	.19	.13	.17	.04	.05	.45	.56	.60	.42	—

Results

The findings of the regression analysis for the pay satisfaction scale are summarized in Table 3. As can be seen in column 1, Table 3, the overall regression model explained 21 percent of the variance (R^2) of pay satisfaction. The regression coefficient for the union variable was positive and significant ($p \leq .01$), indicating that union faculty members were more satisfied with their pay than were nonunion faculty members when controlling for the effects of other determinants of pay satisfaction. Also, the union variable increases the variance explained from 18 percent to 21 percent when inserted last in the analysis. The most significant control variable was pay level ($p \leq .001$), a finding that agrees with most of the pay satisfaction literature (Dyer, Schwab, & Theriault, 1976; Nash & Carroll, 1975). Other control variables reaching statistical significance included sex, tenure, and years of experience. The age and faculty group variables were not significant. The decomposition of the direct and indirect effects of the union variable on pay satisfaction via pay level as an intervening variable indicated that the direct effect (.147) was significant at $p \leq .05$; the indirect effect (.004) did not attain statistical significance.

Table 3
Regression Coefficients and Standard Errors
for the Determinants of Faculty Pay Satisfaction
Under Union and Nonunion Conditions

<i>Variables</i>	<i>Total Sample (N=263)</i>	<i>Union System (N=127)</i>	<i>Nonunion System (N=136)</i>
Union ^a	.254** (.114) ^b	N.A.	N.A.
Sex	-.255* (.139)	-.326* (.139)	-.196 (.209)
Faculty group	.141 (.133)	.091 (.103)	.039 (.223)
Pay level	.320*** (.052)	.316*** (.051)	.294*** (.081)
Age	-.003 (.006)	-.003 (.006)	.013 (.010)
Years experience at institution	.021* (.012)	.028 (.013)	.016 (.018)
Tenure	-.486** (.188)	-.448*** (.167)	-.658** (.262)
R ²	.21***	.25***	.20***
Constant	1.91	2.50	1.47

^aAdding union as the last variable in regression increases the R² from .18 to .21.

^bStandard errors appear in parentheses.

* $p \leq .05$

** $p \leq .01$

*** $p \leq .001$

Columns 2 and 3 in Table 3 summarize the two separate regression equations for pay satisfaction under union and nonunion conditions. The expectation that the discrepancy in pay satisfaction between Business Administration and Liberal Arts would be greater under union conditions did not materialize. As expected, the pay level variable was highly significant and positive ($p \leq .001$) in both regression equations. An interesting finding from this analysis is that the sex variable was significant and negative in the union regression ($p \leq .01$) and insignificant in the nonunion regression. This indicates that women were more satisfied with their pay than males in the union system, but there were no differences in pay satisfaction by sex in the nonunion universities. In both equations untenured faculty members exhibited a higher level of pay satisfaction than did the tenured faculty.

Despite the low bivariate correlations between the predictor variables (Table 2) a test for first and second order interactions was completed in order to preclude the threat of multicollinearity in interpreting the regression results. Interactions on pay satisfaction were tested for (1) faculty group, tenure, and sex and (b) age, tenure, and years of experience. Neither first nor second order interactions were found to be significant.

Table 4 shows the regression coefficients and standard errors for the union, pay level, and other demographic variables on various dimensions of job satisfaction. None of the union coefficients reached statistical significance. Among the demographic variables, pay level was found to be the main determinant of job satisfaction, a finding that is consistent with much of the previous research in this area (Centers & Bugental, 1966; Friedlander, 1965; Hall, 1975).

Table 4
Regression Coefficients and Standard Errors
for the Determinants of Faculty Satisfaction
With Various Job Dimensions
(N = 263)

<i>Variables</i>	<i>Promotion</i>	<i>Supervision</i>	<i>Job Content</i>	<i>Resource Adequacy</i>	<i>Job Context</i>
Union ^a	-.021 (.149) ^b	.086 (.137)	-.030 (.080)	.094 (.148)	-.035 (.077)
Sex	-.150 (.183)	.098 (.168)	-.077 (.098)	.058 (.182)	-.039 (.095)
Faculty group	.001 (.179)	-.060 (.160)	-.004 (.093)	.026 (.174)	-.088 (.091)
Pay level	.373*** (.069)	.070 (.063)	.054 (.037)	.157** (.068)	.079* (.035)
Age	-.002 (.008)	-.006 (.007)	.006 (.004)	.001 (.008)	.001 (.004)
Years of experience at institution	.016 (.016)	.036* (.015)	.005 (.008)	.025 (.016)	.020* (.008)
Tenure	-.187 (.247)	-.623** (.227)	.005 (.132)	-.310 (.246)	-.276* (.128)
R ²	.16**	.04	.02	.06*	.07*
Constant	1.60	3.19	4.21	1.92	3.09

^aAdding union as the last variable in regression increases R² by less than .000 for each of the five job dimensions.

^bStandard errors appear in parentheses.

* $p \leq .05$

** $p \leq .01$

*** $p \leq .001$

Conclusions and Discussion

The current study was undertaken to examine the effect of faculty unions on the pay satisfaction of college professors. Also examined was the impact of faculty unionism on various dimensions of job satisfaction.

The results indicate that the presence of a faculty union is positively associated with pay satisfaction, after controlling for several correlates of pay satisfaction. No significant differences in pay satisfaction were observed between Liberal Arts and Business Administration faculty in any of the regression equations. Although "high market" faculty groups have been reported to oppose collective bargaining fearing a negotiated leveling of salaries across different units in the university (Bigoness, 1978; Ladd & Lipset, 1973), the suggestion that in a union system the "high market" group would be less satisfied with their pay than the "low market" group was rejected in this study. These findings are important because pay satisfaction is a very strong predictor of turnover (Weiner, 1980) and is likely to affect the quality of recruits (Lawler, 1971).

An interesting finding to emerge from this study is that the union moderates the relationship between gender and pay satisfaction for faculty members. Women were more satisfied with their pay than males in the union system, but no differences by sex were observed in the nonunion system.

A question that arises from the interpretation of the data is the extent to which the faculty union creates higher levels of pay satisfaction for women by reducing pay discrimination in the university system. There is a growing amount of cross-sectional research in industry suggesting that unionized environments tend to reduce pay differentials by sex and that women who work under union conditions receive a wage advantage over women in the nonunion sector (Pfeffer & Ross, 1981). Data in the present study are consistent with this hypothesis because the average male/female earning differential by faculty rank is over twice as high in the Wisconsin system (\$150 per month) than in the Minnesota system (\$61 per month). When the average earning differential by sex was included in this study as an intervening variable between union status and the pay satisfaction scale, both the direct effect (.130) and the indirect effect (-.110) were significant at $p \leq .01$ (standard formula, Kerlinger & Pedhazur, 1973). One of the features of contractually specified union pay systems is that once entry is allowed, they set specific pay criteria for various positions in the organization, and everyone meeting those criteria tend to receive comparable pay. Given the equalizing effect of the union, the Lawler model would predict a positive effect of the union variable on the pay satisfaction of women. This is an area that deserves further research in the future.

The very high and positive regression coefficients of pay satisfaction for pay level in both union and nonunion conditions converge with, and support, those obtained by other investigators in widely diverse populations and organizational settings (Dyer & Theriault, 1976; Lawler & Porter, 1966; Schwab & Wallace, 1974). This suggests that faculty members also react strongly to dollars and cents, indicating that *objective* pay is at least as important to their pay satisfaction as it is for other groups. Therefore, both union and nonunion universities must continue to meet these needs if high quality, scarce faculty are to be attracted and retained.

The findings reported here on the union's effect on faculty pay satisfaction are generally consistent with those found in other employee populations (Hammer, 1978; Kochan & Helfman, 1981). Unlike the findings of Kochan and Helfman (1981) among hourly workers, however, the union did not have a negative effect on faculty satisfaction with promotion, supervision, job content, job context, and resource adequacy needed to do the job. Therefore, no evidence was found in this study to suggest that organized faculty members trade off higher satisfaction with "bread and butter" issues in exchange for lower satisfaction with other job dimensions.

As a final consideration, it should be noted that untenured faculty members were more satisfied with their pay in both union and nonunion conditions. The reasons for these findings are unclear and should be addressed in future research. One potential explanation may be the so-called "wage compression" effect whereby the earnings of new faculty members have been rising faster than those of tenured faculty members who are "locked" into the system and in many cases enjoy less mobility than their junior counterparts. This trend has been even more pronounced for business schools

that have experienced an explosive demand for new assistant professors, raising their starting salaries by over 30 percent since 1979, at a time when the rate of increase for senior professors has lagged substantially behind (American Association of University Professors, 1982).

One of the limitations of this study is the possibility that other exogenous factors not included in the regression equations may be related to the presence or absence of a union as well as the observed differences in pay satisfaction between the Minnesota and Wisconsin samples. For example, subtle differences in administrative procedures at the department level may have an unanticipated effect on pay satisfaction. Although the danger of spurious relationships with pay satisfaction in this study may be a cause of concern, the procedures utilized for selecting the samples and research sites were designed to minimize this possibility. That the findings reported here on faculty pay satisfaction under union and nonunion conditions are consistent with those found in other groups tends to strengthen their validity.

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Evaluating In-Role and Out-of-Role Performers¹

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The Citadel

Performance evaluation when in-role and out-of-role behavior are manipulated in a male sex-typed occupation was investigated. Level of performance (high and low), mode of behavior (masculine and feminine), and performer sex were manipulated. Results indicate that performance evaluation is a winnowing process wherein raters assign ratings on the level of performance and value masculine over feminine modes of behavior, especially for female high performers.

Findings from empirical research in performance evaluation, attitude and attributional theory suggest a network of relationships for the appraisal of performance. Five areas of this research are relevant here. First, Dipboye and Wiley (1977), Frank and Drucker (1977), Hall and Hall (1976), and Terborg and Ilgen (1975) suggest that when distinctive and consistent performance evaluation is provided, one should be able to assign identical ratings for equivalent performance levels irrespective of the sex of the employee. Second, the mode of behavior, defined as the manner in which the performance is carried out, appears to have a major impact on the evaluation of performance. Individuals rated most successful on the job commonly exhibit masculine mode characteristics (Grey & Kipnis, 1976; Schein, 1975; Spence & Helmrich, 1972). Third, because occupations appear to be sex-typed, most performance appraisal systems use the male stereotyped task and male performance levels as standard measures (Cash, Gillen, & Burns, 1977; Cohen & Bunker, 1975; Epstein, 1970; Muchinsky & Harris, 1977; Shinar, 1975). Fourth, evaluational bias may be based on rater attributions (Deaux, 1976; Deaux & Emswiller, 1974). As Nieva and Gutek summarize, "while females are evaluated less favorably than males when they are highly qualified or perform well, females are evaluated more favorably than males when both are not well qualified or are unsuccessful performers" (1980, p. 274). Fifth, the appraisal is affected by expectations about

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behavior (Deaux & Taynor, 1973; Etaugh & Brown, 1975; Kelley, 1972; Kelley & Michela, 1980) and by the exhibition of in-role or out-of-role behavior (Jones, Davis, & Gergen, 1961). Two apparent contradictions appear to emerge from the research. One set of findings indicates that performance, if equivalent, will be evaluated similarly irrespective of the performer. Another suggests that sexual and occupational roles and the social expectations based on them have a major impact on the evaluation of performance.

Research further suggests that the appraisal process is a network that depends on raters observing variations among performers and distinguishing between high and low levels of performance in assigning ratings. Within high and low performance ratings, preferences for in-role behavior (masculine mode in a male sex typed occupation) as opposed to out-of-role behavior (feminine mode in a male sex typed occupation) emerge. Sex appears to account for less of the variance in ratings than does the performance level or mode of behavior.

This experimental study addresses specific questions about performance, in-role and out-of-role behavior, and sex in a carefully controlled and manipulated design. These questions are important to developing a better understanding of performance related variance.

The key questions are framed as hypotheses. First, regardless of role of behavior or the sex of the performer, high performers in a male sex-typed occupation will be distinguished and rated significantly higher than low performers (Bigoness, 1976; Frank & Drucker, 1977; Hall & Hall, 1976; O'Leary, 1974; Powell & Butterfield, 1979). Second, within performance groups and regardless of sex, those performing in the masculine mode will receive higher ratings than will performers in the feminine mode. The masculine mode represents the "male managerial model" (Loring & Wells, 1972; McGregor, 1967; O'Leary, 1974; Schein, 1975). The feminine mode represents characteristics commonly associated with female behavior in the sex-role stereotype (see Bem sex-role inventory, Bem, 1977). In-role performance is defined as masculine mode behavior; that is, behavior that is expected in a male sex-typed occupation. Out-of-role performance is defined in this experiment as the feminine mode. (In addition to the Bem sex role inventory, see Broverman, Broverman, Clarkson, Rosenkrantz, & Vogel, 1970; Broverman, Vogel, Broverman, Clarkson, & Rosenkrantz, 1972; Rosenkrantz, Vogel, Bee, Broverman, & Broverman, 1968; and Schein, 1975.) Third, females performing in the masculine mode of behavior will receive the highest performance ratings in both the high and low performance groups, a consequence of the expectation that females performing in a male sex typed occupation will be less successful than males performing in that occupation. The unmet expectation will be counterbalanced by a higher rating for the female than for an equally performing male. (See Bigoness, 1976; Deaux & Emswiller, 1974; Hamner, Kim, Baird, & Bigoness, 1974; Kelley & Michela, 1980; Leventhal & Michaels, 1971; Taynor & Deaux, 1973, 1975.) Similarly, males performing poorly and in-role will be rated

lower than females performing poorly and out-of-role (Nieva & Gutek, 1980). Fourth, differences in the rated levels of performance will be present within both performance groups when each manager is treated as a separate entity, because of the impact of mode and sex.

Method

Subjects, Design, and Procedure

Participating in the experimental study on a voluntary basis were 69 graduate students enrolled in the Master of Business Administration program at the University of South Carolina. Of the subjects, 46 were males and 23 were females. The majority of the subjects were white with a mean age of 27. The independent variables—level of performance, role of behavior, and sex of the performer—were combined in a repeated measures ANOVA design on all factors (Huynh, 1981; Huynh & Feldt, 1976; Huynh & Mandeville, 1979; Winer, 1971, 1979). The design was selected for its unique criterion setting resemblance and because it allowed a replication of the real life organizational setting in which it quite often is the responsibility of a supervisor to rate a number of individuals sequentially at one time.

In the laboratory experiment, subjects were furnished with an appropriate cover story and requested to act as district managers with administrative authority over the appraisal of the performance of eight supermarket managers in "Megafoods" District III. The performance data were contained in an in-basket simulation. As district manager, each subject was provided with an excerpt from the Megafoods Policy Manual, which contained a description of the company, a brief history, an organizational chart, expectations of volume and profit for retail locations, the company policy statement on performance evaluations of store managers, a sample of the appraisal instrument, and an explanation of what constituted good performance. Subjects were required to study the policy manual, answer a checklist of questions regarding the procedures they were to follow, and have the checklist approved by one of the two experimenters before proceeding further.

The in-basket materials used to simulate the performance of the Megafoods managers consisted of summaries of operations for the past year, financial reports, target and actual sales and profits, commentary from supervisors, critical incidents, excerpts of evaluations of the manager's performance by an outside management consulting firm, Megafoods yearly personnel update forms covering professional and community activities of the managers, summaries of subordinate appraisals, and the manager's self ratings.

The independent variables—in and out-of-role behavior, performance, and sex—were carefully written into the in-basket to conceal the hypotheses of the study. In-role and out-of-role behavior were operationalized as the manner in which the management task was performed. The performance

level was operationalized by the data presented in the financial analysis, supervisors' comments, self and employee ratings, and participation in company training programs. Sex was indirectly identified by assigning traditional male and female names to each of the eight sets of materials contained in the in-basket. The subjects then were required to write the name of the manager on each of the evaluation instruments. This required writing the name of each manager on a set of behaviorally based scales and a set of Osgood semantic differential scales. No other mention was made of sex in the experiment.

The experimental design is depicted in Table 1. The experiment contained four managers in-role (in the masculine mode) and four managers out-of-role (in the feminine mode). These characteristics were integrated so that the subjects rated two in-role high performance managers, two out-of-role high performance managers, two in-role low performance managers, and two out-of-role low performance managers. Each set contained a male and a female performer.

Table 1
Experimental Design

<i>Store</i>	<i>Assigned Sex</i>	<i>Behavioral Mode</i>	<i>Level of Performance</i>
A	female	masculine	low
B	female	masculine	high
C	female	feminine	high
D	male	masculine	high
E	male	masculine	low
F	female	feminine	low
G	male	feminine	low
H	male	feminine	high

The order of presenting the managers in the in-basket was randomized to insure against the systematic influences of fatigue, contrast, and order of presentation effects. A random numbers table was used to arrange the in-basket simulations before they were picked up by the subjects in the laboratory. A male and female experimenter participated equally in the administration of the experiment to reduce the effect of sex, evaluation apprehension, and demand characteristics. To counteract experimenter expectancy, the treatments were camouflaged within the in-basket simulation.

Each subject in the laboratory experiment rated the performance of a random arrangement of the eight simulated store managers. The subjects were requested to read the data for each manager and then rate that manager on four behaviorally based scales (Schneier & Beatty, 1979) and a set of Osgood scales before proceeding sequentially with the rating of all eight managers in the in-basket simulation. The four behaviorally based scales were averaged to provide one dependent measure of performance for each of the eight managers for every subject rating. The Osgood scales were used to check on the manipulations of performance and roles.

Pretesting of the Occupational Role and Experimental Manipulations

Occupational Pretesting. The roles of supermarket manager, grocery store employee, and stock clerk were added to Shinar's (1974, 1975) list of occupations. Each listed occupation was followed by a 7-point ranking scale (Osgood, Suci, & Tannenbaum, 1957) on which 38 MBA graduate students checked their first perception of whether the occupation was masculine (1) or feminine (7). Supermarket manager was rated as a male-sex-typed occupation with a mean of 1.37, standard deviation of 1.55, and standard error of the mean of .25. The most commonly checked reason for the rating of the supermarket manager as masculine was the "proportion of men employed in the occupation."

In-Basket Simulation—Experimental Manipulation of Mode of Behavior and Performance Level. The in-basket simulation of supermarket managerial performance was carefully developed to include high and low levels of performance and in and out-of-role behavior for the male sex typed occupation. The development of the in-basket materials proceeded through two stages. In the first, performance level and in-role and out-of-role behavior were established and tested in an androgynous context (sex was not identified). At the second, sex of the performer was added to the in-basket and tested for distinctiveness. These data incorporated the "hard" and "soft" criteria noted above. The hard criteria were composed of the financial reports, target and actual sales and profits, commentary from supervisors on performance, yearly updates, and so on. All in-basket materials were based on job behaviors that are required and expected of managers in the retail and wholesale grocery business. The soft criteria, operationalized within the performance data as in-role and out-of-role behavior, represented the manner in which the management task was performed. The in-role behavior, that expected in this male sex-typed occupation, was identified as the masculine mode of behavior. It incorporated variables identified by Broverman et al. (1970, 1972); Rosenkrantz et al. (1968); Sedgwick (1973); and Spence, Helmrich, and Stapp (1975). The behavior that was operationalized is similar to that in the Bem sex-role inventory (Bem, 1977). The 20 adjectives employed characterized managers as being ambitious, self-reliant, independent, and assertive and included neutral variables such as truthful, happy, and concern. Also, 20 adjectives described the feminine mode, out-of-role performers. These incorporated variables such as affection, gentleness, and understanding and included the neutral personality characteristics as used within the masculine mode. The simulation was shaped to include both positive and negative behavioral dimensions, a critical aspect of employing the Bem sex-role inventory. For a full and complete analysis of the modes and performance levels with sex attached, see Moore (1981).

Testing of In-Basket Materials with Manipulations of Performance and Roles. Participating in a pretest of the in-basket simulations for the eight managers were 54 students enrolled in business courses. Of these subjects, 23 were male and 31 were female. The mean age was 26. A cover story

informed subjects that a performance appraisal system was being developed for a company described as Megafoods, Inc. The in-basket materials contained eight sets of data, one for each manager, labelled A-H. Subjects were requested to read the materials for the first manager in the in-basket simulation and rate that manager on two Osgood semantic differential 7-point scales. The first rating was on the role of behavior that had been operationalized on the basis of characteristics in the Bem inventory as in-role (masculine mode) and out-of-role (feminine mode) behavior. The behavior scale was labelled from masculine (1) to feminine (7). (Numbers were not used on the scales that were given to raters.) Raters then evaluated the performance displayed by the manager on a second scale as ranging from high (1) to low (7). This procedure was repeated for the next seven managers. At the conclusion of the rating process, each subject was asked to evaluate the performance data that had been presented in the in-basket simulation. The raters evaluated the data as comparable to those job behaviors associated with being a supermarket manager and as sufficient for making performance ratings.

Analysis of Pretest of In-Basket Simulation. A repeated measures ANOVA showed a main effect for performance [$F(1, 53) = 237.32, p < .001$]. The grand mean of performance was 3.31 with an *SD* of .78. The mean for high performers was 1.98 with an *SD* of .64, and the mean for low performers was 4.63 with an *SD* of .91. The ANOVA showed a main effect for mode [$F(1, 53) = 119.09, p < .001$]. The mean for the masculine mode was 2.14 with an *SD* of .67, and the mean for the feminine mode was 4.13 with an *SD* of 1.11. The analysis of this pretest was used to establish the performance levels and modes for each of the eight managers. Managers B and D were verified as masculine mode high performers, A and E as masculine mode low performers, C and H as feminine mode high performers, and F and G as feminine mode low performers.

Dimension of Sex Is Added to the In-Basket Simulation. The pretest of the material at Stage 1 made no mention of sex of the performer. Once the performance level and the roles had been established, the managers in the in-basket were assigned traditional male and female names.

Manipulation Checks

A role scale and a performance scale were imbedded in a series of ten Osgood semantic differential scales that were completed sequentially by subjects after rating the performance of each manager. The function of the scales was to check on the manipulation of the variables in the laboratory experiment.

Two separate 2×2 repeated measures ANOVA designs were used to test the effects of the manipulation of roles, performance levels, and sex. The first analysis was of performance and sex. The Osgood scale ranged from (1) high performance to (7) low performance. The grand mean on this scale was 3.22 with an *SD* of .80. This analysis yielded main effects for

performance [$F(1, 68) = 628.67, p < .001$] and sex [$F(1, 68) = 4.54, p = .037$]. The mean for the high performer was 1.88 with an *SD* of .65. The male high performer was rated slightly lower than the female high performer with means, respectively, of 1.93 and 1.81 and similar *SDs* = .68 and .62. The mean for the low performers was 4.57 with an *SD* of .95. Within the low performance group, males received lower performance ratings than did female low performers (i.e., 4.69 and 4.44 with similar *SDs* of .97 and .94). Performance was recognized as high or low irrespective of the sex of the performer. Within groups, females were ranked higher than males. In the high performance group, the mean difference was .12; and within the low performance group, the mean difference was .25. There was no interaction between sex and performance. This analysis suggests that the level of performance was assessed as manipulated on the original Osgood scale in the pretests. Debriefing sessions and interviews with subjects revealed that they did not perceive the use of the Osgood Scales as a manipulation check.

The manipulation check for in-role and out-of-role behavior was a measure of the masculine (1) to feminine (7) dimensions on the Osgood scale. The grand mean from the second repeated measures ANOVA for role behavior was 3.84 with an *SD* of 1.18. This high *SD* may be interpreted to represent indecisiveness on the part of the rater. The ratings indicate that some subjects associated this scale with sex rather than mode of behavior. The two-way analysis had main effects for mode [$F(1, 68) = 89.98, p < .001$] and sex [$F(1, 68) = 106.10, p < .001$]. The in-role (masculine mode) performer was rated the most masculine with a mean of 2.01, *SD* .98. The mean rating for the female using the in-role (masculine mode) behavior was rated as more androgynous—4.45 with a large *SD* of 1.58. The feminine mode male performer's mean was more masculine (3.41, *SD* 1.04) than the masculine mode female performer. The feminine mode, female performer was rated as most feminine (5.47, *SD* 1.15). A two-way interaction occurred between mode and sex [$F(1, 68) = 4.28, p = .042$].

Results

Hypotheses

Hypothesis 1, that the high performance group would differ significantly from the low performance groups regardless of the mode of behavior or the sex of the performer, was confirmed by an ANOVA repeated measures analysis on all three factors. A main effect was obtained for performance. The mean for the high performance group was 1.89, and the mean for the low performance group was 3.98 with *SDs* respectively of .49 and .55. This analysis required the examination of ratings for the predetermined high and low performers to determine if the raters had been able to distinguish clearly the high performer from the low performer. The difference of 2.09 between the high and low group indicates that, irrespective of sex or mode of behavior, high and low performers were rated in accordance with the

Table 2
Three-Way Analysis of Variance Summary for
Performance Evaluations of High and Low Performers

<i>Source</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>
Performance	602.08	1	602.09	1499.53**
	27.30*	68	.40	
Mode	14.51	1	14.51	60.59**
	16.28	68	.24	
Performance/mode	1.00	1	1.00	5.66*
	12.02	68	.18	
Sex	6.96	1	6.96	26.69**
	17.74	68	.26	
Performance/sex	.88	1	.88	4.36*
	13.67	68	.20	
Mode/sex	5.48	1	5.48	33.96**
	10.97	68	.16	
Performance/mode/sex	8.88	1	8.88	52.57**
	11.48	68	.17	

*The number appearing under each of the labelled sources for *SS*, *df*, and *MS* represents the error term.

* $p < .05$

** $p < .001$

level of performance displayed. Table 2 gives a summary of the three-way ANOVA.

Hypotheses 2a and 2b dealt with analyzing modes of behavior (in and out-of-role behavior) that were displayed in the high and low performance groups, respectively. Each question was addressed through a 2×2 repeated measures ANOVA. The complete analysis is presented in Table 3 (Huynh, 1981). For Hypothesis 2a, that within the high performance group and regardless of sex, those performing in the masculine mode would receive higher ratings than performers in the feminine mode, an ANOVA for the predesignated high performers (B, C, D, and H) was completed. Ratings in this 2×2 ANOVA for masculine mode managers (B and D) and the feminine mode managers (C and H) were compared. The main effect for performance was $F(1, 68) = 59.37$, $p < .001$ and for mode was $F(1, 68) = 6.34$, $p < .05$. The mean of the masculine mode, high performer was 1.69 with an *SD* of .47; the mean for the feminine mode, high performer was 2.09 with an *SD* of .51. A mean difference of .40 exists between performers in-role (masculine mode) and performers out-of-role (feminine mode) within this high performance group.

A separate 2×2 repeated measures ANOVA was used to test Hypothesis 2b that within the predetermined low performance group (A, E, F, and G) and regardless of sex, performers in the masculine mode would similarly receive higher ratings. Here the main effect for performance was $F(1, 68) = 17.82$, $p < .001$. The main effect for mode was $F(1, 68) = 27.41$, $p < .001$, indicating a distinction between the two masculine mode performers (A and E) and the two feminine mode performers (F and G). Those performing in the masculine mode (in-role) received the highest performance evaluations within the low performance group with a mean of 3.86, *SD* .54;

the feminine mode (out-of-role) performer's mean was 4.10, *SD* .545. The mean difference here between the in-role and out-of-role performers was .24. It also is important to note that the significant interaction effect between performance and mode within the low performance group [$F(1, 68) = 84.34, p < .001$] accounted for more of the variance than either of the main effects separately or additively.

Hypothesis 3, that females performing in the masculine mode of behavior would receive the highest performance ratings in both the high performance and low performance groups, was confirmed. As is indicated in Table 3, the highest performance ratings in the high performance and low performance group are assigned to the female masculine mode performers. (The lower the mean in numerical value, the higher the rating; that is, scale range 1 (high) to 5 (low).)

Table 3
Means and Standard Deviations for High and Low Performers
(*N* = 69)^a

	<i>High Performers</i>				<i>Low Performers</i>			
	<i>Mode</i>				<i>Mode</i>			
	<i>Masculine</i>	<i>Feminine</i>	<i>Masculine</i>	<i>Feminine</i>	<i>Masculine</i>	<i>Feminine</i>	<i>Masculine</i>	<i>Feminine</i>
	<i>Male</i>	<i>Female</i>	<i>Male</i>	<i>Female</i>	<i>Male</i>	<i>Female</i>	<i>Male</i>	<i>Female</i>
\bar{X}	1.73	1.64	2.19	1.99	4.24	3.48	4.02	4.17
<i>SD</i>	.50	.44	.51	.51	.53	.55	.59	.53

^a23 females; 46 males.

Hypothesis 4, that the mode of behavior and sex of performer have an impact on the performance evaluation, was subdivided into two separate analyses. A one-way repeated measures ANOVA design was used to test Hypothesis 4a, that within the high performance group, when each manager is treated as a separate entity, differences in the rated levels of performance will be present because of the impact of mode and sex. This hypothesis was supported by the main effect [$F(3, 204) = 22.56, p < .001$], and a group mean of 1.89, *SD* .49, indicated statistically significant differences among the performers within the high performance group. The independent effects accounted for 39.84 sum of squares with a mean square of .20. Masculine mode performers (B and D) received the highest ratings, and within this group the female (B) was rated higher than the male (D). The female performing in the feminine mode (C) received a higher rating than the male in the feminine mode (H). (See Table 3.)

The second subdivision, Hypothesis 4b, that within the low performance group, when each manager is treated as a separate entity, because of the impact of mode and sex, differences in the rated levels of performance will be present, was also tested with a one-way repeated measures ANOVA. A significant main effect for different performance levels within the low performance group was observed [$F(3, 204) = 39.35, p < .001$]. Although the

performance effect accounted for 24.49 SS, the independent effects accounted for 42.32 SS, and the mean squares were respectively 8.16 and .21. Within the low performance group, the highest rating was given to a female performing in the masculine mode (A), the second highest rating a male performing in the feminine mode (G), and the third highest the female performing in the feminine mode (F). The lowest rating in the low performance group was received by a male in the masculine mode. (See Table 3.)

Post Analysis of Interactions

The interaction between the level of performance and the mode of behavior [$F(1, 68) = 5.66, p = .02$] suggests that the feminine mode affected the rating more adversely for the high performer than it did for the low performer. A different effect may have taken place with the interaction of performance and sex [$F(1, 68) = 4.36, p = .04$]. Here the sex effect was greater for the low performer. Specifically, males in the low performance group obtained lower performance ratings than did females in the low performance group. Among the high performers, sex appears to have made little difference in the rating of the male or the female. The two-way interaction between mode of behavior and sex accounted for the third largest amount of variance outside the main effect of performance [$F(1, 68) = 33.96, p < .001$]. Within the high performance group, the female performing in the masculine mode received the highest performance rating, but the reverse was not true for the female low performer in the feminine mode. This interaction indicates (1) that the masculine mode of behavior can greatly improve the female's performance rating and (2) that although a feminine mode will increase the low performing male's rating, the change in magnitude is lower than the increase for the female performing in the masculine mode. The three-way interaction of performance, mode, and sex accounts for almost the same amount of explained variance in the model as the main effect of mode [$F(1, 68) = 52.57, p < .001$]. This further suggests the desirability of performance for the female in the masculine mode.

Summary Analysis

Table 2 presents the $2 \times 2 \times 2$ analysis of variance summary for the eight performers. The means and standard deviations are presented from the ANOVA analysis in Table 3. Because the sample size is relatively small in this experiment, the small differences in the means represent significant differences in the ratings of performers on the basis of performance levels, in-role and out-of-role behavior (modes), and sex. Within the high performance group, performers in-role (B and D) receive the highest ratings by a mean difference of .30 from the out-of-role performers (C and H). Although statistically significant differences also occur within the low performance group, the mean differences between in-role performers (A and E) and out-of-role performers (F and G), .14, are less.

Table 4 provides the results of 2×2 ANOVA analyses of all male performers as a group and all female performers as a group. The basis of classification within each group is, first, mode and, second, performance levels. In this table, high and low performance levels are classified under in-role and out-of-role behavior. The first division is for the four all male performers and the second division is for the four all female performers.

Table 4
Analysis of Variance Summary
for In-Role and Out-of-Role Performers by Sex

<i>Source</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>
<i>All male performers</i>				
Mode (in role and out-of-role)	1.08	1	1.08	4.82*
	15.22 ^a	68	.22	
Performance	324.45	1	324.45	906.52**
	24.34	68	.36	
Mode/performance	7.92	1	7.92	38.98**
	13.82	68	.20	
<i>All female performers</i>				
Mode (in-role and out-of-role)	18.91	1	18.91	106.82**
	12.04	68	.18	
Performance	278.51	1	279.51	1138.47**
	16.63	68	.24	
Mode/performance	1.96	1	1.96	13.76**
	9.68	68	.14	

^aThe number appearing under each of the labelled sources for *SS*, *df*, and *MS* represents the error term.

* $p < .05$

** $p < .001$

In the all male performance group, across both high and low performance ratings, the main effect for mode was significant. The mean for the masculine mode male performers was 2.98, $SD = .52$. The mean for the feminine mode male performers was 3.11, $SD = .55$. The males using the masculine mode (in-role) behavior received higher performance evaluations on the average of .13 than the males using the feminine mode (out-of-role) behavior. Though this difference in mean ratings is small, it is statistically significant. The performance effect accounts for much more of the variance.

In the all female performance group, including both high and low performance ratings, the main effect for mode was significant. The mean for the masculine mode female performers was 2.56, $SD = .50$. This differed by .52 from the mean rating of the feminine mode female performers, which was 3.03, $SD = .51$. The mean difference in modes of behavior, in-role and out-of-role is more pronounced within this female performance group than in the male performance group. Performance accounts for more of the explained variance in the female group than in the male performance group. The interaction effect represents less variance for the all female performance group than it did for the male group.

Although the analysis in Table 4 presents still another dimension bearing on the understanding of in-role and out-of-role behavioral effects on

performance ratings for the two respective sexes, it is important to note that the analysis crosses high and low performance ratings.

Discussion and Conclusions

This experimental study revealed that raters divided performers into high and low performance groups irrespective of sex. This finding supports the Hamner et al. (1974) conclusion that when performance standards are set: (1) potential employers are able to distinguish between high and low performers; (2) low performing males and females are rated nearly identically as low performers; (3) high performing females performing in the masculine mode are rated significantly higher than high performing males; (4) the performance level of the female is a more important determinant of the performance rating than it is for the male.

Females performing in the masculine mode of behavior received higher evaluations than other performers within both performance groups. This finding supports theoretical propositions regarding out-of-role behavior (Jones & Davis, 1965; Jones & Nisbett, 1972; Jones et al., 1961) as well as the research of Grodsky (1975), Recely (1973), Sedgwick (1973), and Spence and Helmrich (1972). In addition, the findings suggest a new interpretation of Nieva and Gutek's (1980) statement that females are evaluated less favorably than males when they are highly qualified or perform well but are evaluated more favorably than males when both are not well qualified or are unsuccessful performers. The suggested modifications are, first, that if the female is a high performer but not performing in the masculine mode, she will be evaluated less favorably than the male performing in the masculine mode. Second, if the female is a low performer she will receive a better evaluation than the low performing male only if she is performing in the masculine mode.

The post analysis of the interaction effects suggests the following: First, a feminine mode of behavior tends to affect the rating more adversely for the high performer than for the low performer. The masculine mode model appears to be pervasive in the male sex-typed occupation. Second, the sex effect tends to be greater for the low performer than for the high performer. This suggests that in rating high performers the performers' sex makes little difference, but in the low performance group a reinforcing mode effect appears; the female performing in the masculine mode who also is out-of-role is rated higher than the male performer. Third, when the sex and the mode of the performer are considered by raters, the greatest distinction between the male and the female appears to occur in the masculine mode. The female performing in the masculine mode receives a higher evaluation than the masculine mode male high performer. Fourth, the three-way interaction supports the proposition in the model that all three effects are present simultaneously in the performance evaluation process. The interaction further shows (1) that the masculine mode of behavior can greatly improve the female's performance ratings and (2) that although acting in the

feminine mode will increase the low performing male's rating, the change in magnitude is lower than the increase for the female performing in the masculine mode. The suggestions here are that performing in the masculine mode is considered more desirable, so much so that in the case of low performing males sex visibility overrides the mode of management.

The results of this study appear to lend important support to the testing of causal relationships in the proposed performance network. The in-basket simulation here was developed to give data on performance that were consistent, distinctive, and had consensus ratings. The analysis of the in-basket materials by raters indicates that high performers are distinguished from low performers, irrespective of the role of behavior, sex, or typing of occupation.

After the distinction based on performance is made, other elements, such as social stereotypes, role of behavior, sex-typing of occupations, and the manager's sex, dominate the appraisal process. The interaction suggests that these factors enter into the evaluation process and create a conclusion about performance that is greater than the sum of the various parts.

A double rating standard appears to exist. This is shown in the favorable weights given the unexpected success for the high performance and low performance female as compared to the equivalent male. This unexpected sex effect is even more pronounced when all males and all females are analyzed separately as groups. Females in-role and out-of-role receive higher evaluations than do males in-role and out-of-role. Part of the explanation for this phenomenon may lie in the sex of the rater. An analysis of the mean ratings given to each performer by male raters and female raters revealed that males give higher performance evaluations than do females. However, with the exception of one interaction, which is largely explained by the male ratings, the differences between male and female ratings were not statistically significant.

These findings suggest that managers need training in performance evaluation to become aware of the importance of employing valid and objective criteria in the rating of performance. A comprehensive training awareness program would show managers how to distinguish between performance and characteristics. One can logically assume that an organization will profit from such a targeted program of human resource management: a well implemented program of appraisals that match performance levels. A simulation similar to the one developed here for the eight managers, for example, could be used as a training tool to unveil myths and stereotypes about in-role and out-of-role behavioral modes, sex, and sex-typed jobs. As used in training, the in-basket could focus the attention of managers on the importance of job descriptions, job behaviors, and the appraisal of performance based on consistent, distinctive, and consensus data; that is, on information that is performance related and uniform for all employees and that has been collected over time to reflect an accurate performance profile, and thus avoid hidden agendas and personality based performance ratings.

This laboratory study was an exploratory analysis of simulated job performance at predetermined high and low levels by male and female performers who exhibited in-role and out-of-role behavior. Although the laboratory environment offered advantages in examining these variables under controlled conditions and the design was especially selected to resemble the organizational appraisal process, it is important to conduct more laboratory and field experiments before making extrapolations of the findings directly to settings in which appraising performance is common. There are several reasons for this. Performance levels are seldom as clearly exhibited in the organizational setting as they are in laboratory experiments. Stereotypes associated with in-role and out-of-role behavior usually are more difficult to assess in an organizational environment. As in many laboratory studies, this group of raters was a convenience sample; their responses may not be typical of practicing supervisors and managers. Finally, as in all laboratory studies, the factor of accountability was absent. These raters did not have to give the performance evaluation to the manager and receive feedback as do supervisors in the organization. However, this laboratory study did utilize the strengths of present research strategy in its implementation, including pretesting to determine the occupation's sex-typing, manipulation checks of key variables, male and female experimenters, randomization, checklists of comprehension, pretesting of the in-basket simulations, and sound laboratory techniques. Thus, this exploratory research provides a basis on which future studies of performance levels, roles of behavior, and sex can be modeled. Further research, other laboratory studies and field studies, should examine the relationships among performance, behavior in and out-of-role, and typing of occupations as well as the assignments of attributes to account for performance ratings. One key question is whether raters in the laboratory assign the same attributes for performance related behavior that are displayed in the performance. Further investigation of the network of relationships among performance-related permanent and nonpermanent attributes can improve the existing knowledge of the ways attributions affect administrative practices such as appraisals, promotions, and the impact on individuals' career paths, as well as the effects of feedback in the organizational setting.

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A Role Set Analysis of Gender Differences in Performance, Affective Relationships, and Career Success of Industrial Middle Managers¹

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Results of a field investigation and a follow-up study suggest that pro-male bias may not prevail in middle management. Women managers seem to be promoted faster and are more satisfied in their jobs than their male counterparts. Contextual and demographic variables may account for observed gender differences in performance and attitudinal outcomes.

Research on reactions to women managers has focused on their performance and their affective relationships with others in their role sets (see Terborg, 1977, and Bartol, 1978, for reviews). Most of this research was conducted in the past ten years, and most consisted of laboratory studies using undergraduate students as subjects. This has been especially true when the dependent variable is performance of the person being evaluated (Garland & Price, 1977; Rosen & Jerdee, 1973; Terborg & Ilgen, 1975). There has been more field research when affective relationships were analyzed (Goetz & Herman, 1976; Petty & Lee, 1975; Petty & Miles, 1976; Roussell, 1974). Research on both performance evaluation and affective relationships has produced quite inconsistent results. The external validity of this research is suspect because of the nature of the research setting and the type of subjects used. The purpose of this paper is to report the results of a field study

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that investigated gender differences in performance and affect between the manager and members of his or her role set. Differences in the career success of male and female managers also are evaluated.

Background and Hypotheses

Performance Evaluation

The literature on bias in evaluation of performance by men and women is mixed. Some studies show that men are evaluated more favorably than women (Dipboye, Arvey, & Terpstra, 1977; Dipboye, Fromkin, & Wiback, 1975; Goldberg, 1968; Rosen & Jerdee, 1973; Schein, 1973); others show that women are evaluated more favorably than men (Abramson, Goldberg, Greenberg, & Abramson, 1977; Hamner, Kim, Baird, & Bigoness, 1974; Jacobson & Effertz, 1974; Peters, O'Connor, Weekley, Pooyan, Frank, & Erenkrantz, 1983); and still others show no sex differences (Dipboye & Wiley, 1977; Frank & Drucker, 1977; Hall & Hall, 1976; Moses & Boehm, 1975). This suggests that situational variables may need to be considered in evaluating sex effects. For example, Nieva and Gutek (1980) suggest that women are more likely to be subject to negative evaluation bias when the required level of inference is high, when the job requirement results in sex-role incongruence, and when the woman is highly competent.

Women in middle level management positions may be subject to a high level of sex-role incongruence if the image of the executive is masculine. One might argue further that women who have reached the middle level management positions must be competent. Bias may be stronger toward these competent women than toward less competent ones in lower level or nonmanagement positions. Middle management positions tend to have amorphous criteria for performance. Although not as high as would be required in a hiring situation, a relatively high level of inference may be required in evaluating women who have recently entered middle management. Furthermore, subjective performance evaluations tend to be more susceptible to the personal bias of the individual making the evaluation.

A plausible but relatively unexplored reason for the inconsistent results in the performance evaluation of male and female managers may be the relationship of the rater to the manager being evaluated. A recent study by Deaux (1979) found no differences in the performance ratings given to the male and female managers by superiors. However, self-ratings tend to be lower for the women managers. Using nonmanagement employees, Mobley (1982) also found no sex difference in subordinates' performance ratings by their superiors. He offered two possible explanations. First, supervisors in organizations generally receive training on appraisal and have knowledge about the jobs of the ratees. Second, there are important consequences of supervisor's ratings, including equal employment opportunity implications, employee signatures on the rating form, and employee grievance procedures for perceived unfair ratings. These practical considerations

may encourage supervisors to attend to fairness in performance ratings and to suppress their personal biases. Using psychologists and peer managers as raters, Moses and Boehm (1975) found no sex difference in the potential ratings of 8,885 men and 4,846 women managers. Based on these research results, it seems that sex differences are more likely to occur in self- than in superior- or peer-ratings.

The lower self-ratings may be explained by differences in self-confidence between men and women (Crandall, 1969; Déaux, 1979; Lenny, 1977; Mac-coby & Jacklin, 1974; Nieva & Gutek, 1981). Women with a low self-confidence also rate themselves lower, especially when they compare themselves to their peers, the majority of whom are male. Peers in the woman manager's role set may be affected more by pro-male bias because their ratings of effectiveness may have fewer consequences than superior's ratings. Furthermore, women may be viewed as competitors by their male peers. Hagen and Kahn (1975) produced some evidence to suggest that competent women may be evaluated negatively in a condition of competition. Sex bias also may be present in subordinate ratings if subordinates have a tendency to perceive women managers as possessing less power and having less access to resources than male managers (Kanter, 1977; Nieva & Gutek, 1981). Based on existing literature and further conceptualization, the following hypothesis is formulated on performance ratings of men and women middle level managers.

Hypothesis 1: Male middle managers will be evaluated more favorably on perceived performance effectiveness than women middle managers. Further,

Hypothesis 1a: There will be a larger discrepancy in the superior-, subordinate-, peer-, and self-ratings for the female than for the male managers.

Affective Relationships

In general, the research literature suggests that women in leadership positions are liked less well than men holding similar positions (Haefner, 1977; Hagen & Kahn, 1975), although contrary evidence also exists: for example, subordinates express a more favorable attitude toward female than male managers (Gupta, Beehr, & Jenkins, 1980; Osborn & Vicars, 1976). This finding seems to be more evident with women managers in higher management levels (Adams, 1978; Terborg, Peters, Ilgen, & Smith, 1977). When the manager's level and job type were controlled, no difference was found between nonmanagement employees' attitudes toward managers of either sex (Terborg & Shingledecker, 1983). Superiors, on the other hand, were found to have slightly more favorable attitudes toward their male subordinate managers than their female subordinate managers (Déaux, 1979). These inconsistent findings on others' affect toward a target manager of different gender also may be explained by the rater's work relationship to the manager. Differences in affect toward the male and the female managers may depend on whether they are in superior, subordinate, or peer roles.

Tokenism has been one explanation offered for the presence of women executives (Kanter, 1977; Taylor, Fiske, Etcoff, & Ruderman, 1978). If women managers at the middle levels are perceived as tokens, the affective relationship between them and their role set members may also be constrained. Peers, especially, may have greater dislike for women managers when they are seen as direct competitors for scarce organizational rewards such as high level management positions. The small number of women executives also may make them more noticeable for attribution of negative feelings (Kanter, 1977). If "similarity attracts," then superiors, the majority of whom are males, may prefer their male over their female subordinates. The reactions of subordinates to middle level female managers, on the other hand, are more difficult to predict. These managers would be in a stronger power position than those in first line supervisory positions. Research shows that subordinate's negative reaction is usually toward lower level managers. It is unknown, however, if these negative reactions are generalizable to relationships in the higher organizational levels. Based on the available research and on further conceptualization on affective relationships, the following hypothesis was formulated.

Hypothesis 2: Overall, affect expressed by superiors, peers, and subordinates will be higher for male than for female managers in the middle management levels. Further,

Hypothesis 2a: There will be a larger discrepancy in the affect expressed toward the female managers than toward the male managers. Peers will express the least favorable affect toward women managers, followed by superiors and lastly by subordinates.

Career Success

The presence of women in the executive suite is a recent phenomenon and is still rare (Harrigan, 1981; Stewart & Gudykunst, 1982; U.S. Bureau of the Census, 1980). Overall statistics continue to show great disparities between incomes of women and men. Laboratory studies have continued to show that women are less likely than men to be hired (Dipboye et al., 1977; Rosen & Jerdee, 1973; Shaw, 1972), less likely to be promoted (Miner, 1974; Rousell, 1974), and more likely to be hired at lower salaries than men into comparable positions (Dipboye et al., 1977; Terborg & Ilgen, 1975). Other than overall census statistics showing women to be earning less than men and research showing fewer women in executive levels, field research on career progress of women relative to men is lacking.

There is reason to speculate that women may have made some progress in promotion and salary because of legislative requirements and social responsibility of employers. These contextual factors may affect decisions of managers more than their personal biases. Although personal prejudices still may exist, employers responding to social and legal pressures may promote women over men with similar background and qualifications. Thus, though it is hypothesized that bias still may be present in perceived

performance effectiveness and in expressed affect toward female managers, the women who have already made it into management may fare better in terms of objective reality such as promotion rate or merit increases. Based on recent empirical observations and on the impact of the legal and social contextual factors, the following hypothesis regarding the career progress of women is formulated:

Hypothesis 3: Women managers will experience greater career success than men in terms of promotion rate and merit increase. However,

Hypothesis 3a: There will be fewer women than men in higher management levels.

One dimension of career success is the person's affect toward the job and its associated dimensions. Women may have made some progress in male-dominated organizations, but their attitudes toward the job and toward relationships with others may be constrained because of bias and unfavorable attributions. It thus is further hypothesized that:

Hypothesis 3b: Women managers will express a lower level of job satisfaction than male managers.

These three hypotheses were tested in the field using a group of industrial middle managers in two separate studies. The first study was conducted in the winter months of 1981 and a follow-up study was conducted in the summer of 1982. Data were obtained in the first study to test all three hypotheses. The second study provided data to test Hypotheses 3 and 3b.

Method

Sample

The sample consisted of 217 male and 78 female middle level managers in a multicompany corporation that has businesses in the computer, data services, education, and finance industries. The initial sample was a nationwide 10 percent stratified random sample of male and 50 percent of female managers in this corporation. The stratification was to ensure sufficient representations in the primary functions of marketing, research and development, manufacturing, and administrative services as well as representation from the various regions and industries. The response rates for both the male and the female managers were 66 percent.

The sample also consisted of the superiors, subordinates, and peers of these 295 managers. For the male managers, there were 173 superiors, 387 subordinates, and 303 peers. For the female managers, there were 67 superiors, 133 subordinates, and 111 peers. The response rates from these role set members for the male and female managers are also similar, ranging from 70 percent to 89 percent. On the average, the female managers were younger (37.6 years) than the male managers (43.2 years). The difference was significant ($t = 5.21, p < .001$). Women also had less company tenure (9.2 vs. 12.3 years) and less years of management experience (4.1 vs. 12.8 years). The differences also were significant ($t = 3.44, p < .01$ and $t = 4.07$,

$p < .001$, respectively). There was no difference in their educational levels. Almost all the superiors were male for both the female (94 percent) and the male managers (98 percent). Female managers had more female subordinates (67 percent) than did the male managers (22 percent). There also were more female peers (30 percent) for the female than for the male managers (8 percent). This pattern of respondents may be a result in part of the selection procedure that was employed in the identification of these role set members. Information is not available as to whether female managers actually have more female subordinates than the male managers in this organization. This role set pattern, however, may reflect the chosen social network of informal interactions among these men and women managers.

Research Procedure

The managers were first introduced to this research by a letter from the corporation's vice president for public affairs and personnel. One week following this letter, each manager received a packet of six survey questionnaires from the first researcher. The cover memo in the packet explained in detail the purpose and nature of this research. Although the research was not entirely anonymous, a high level of confidentiality was guaranteed. The manager was asked to complete one of the survey instruments and distribute the others to five individuals. Three criteria were given in the selection of these other people. First, the manager must select one superior, two subordinates, and two peers. Second, they must be those with whom the manager interacted most frequently on job-related matters. Third, the manager must choose one subordinate and one peer with whom he/she worked best and one of each with whom he/she worked least well. These individuals could be in either direct or indirect reporting relationships. Because of the matrix structure of this corporation, frequency of interactions rather than formal hierarchical relationship was a meaningful criterion for selection of relevant role set members. The third criterion was to ensure some level of representativeness in the subordinate and peer categories and to avoid the selection of "friends." A better design would have been for the researcher to select the other individuals on a random basis. However, identifying the entire role sets for 295 managers is not an easy task; in fact, it was prohibitive because of the complex matrix structure. Although the design used is less than ideal, there is some confidence that these role set members may have some level of representativeness to the actual role set composition. A follow-up telephone conversation with 45 randomly drawn managers indicated that these criteria were in general reasonable and followed. The higher percentage of female subordinates and peers for the female managers seems to indicate that female managers still feel more comfortable with other females in the organization. Similarly, male managers tend to select mostly male peers and subordinates.

All respondents were provided with a self-addressed, stamped envelope for returning the completed survey directly to the researcher at the university.

The manager's name was identified on all the questionnaires. The role set members could remain anonymous. Confidentiality was strongly emphasized to all the participants. The high response rates (from 66 percent to 89 percent) suggest that the participants were not uncomfortable with the nature of this research.

Measures

Perceived performance effectiveness was measured by a 3-item scale developed by Tsui (1984). It measures the extent to which the ratee is performing his/her roles and responsibilities in the manner that the rater would like them to be performed. Thus it reflects the degree to which the manager has met the performance expectations of the rater. A separate performance score was obtained from the superior, the subordinates, and the peers. When two subordinates or two peers provided the ratings, the average score was used. This was necessary for obtaining a constituency score. The interest here was the perceptions of the subordinates and the peers as separate constituencies, rather than as separate individuals. A test of performance ratings by the two subordinates showed no difference in the mean ratings ($t = .61$, n.s.). There also was no difference between the two peers' ratings ($t = .33$, n.s.). Thus, using the average of two respondents' scores to form the constituency score was justified on both conceptual and empirical grounds. Self-rating of performance effectiveness also was obtained. The internal consistency reliability estimates for this variable are shown in Table 1.

Affective relationship was measured by a 3-item scale adapted from the affective bond scale by Kahn, Wolfe, Quinn, Snoek, and Rosenthal (1964). It consists of three components: admiration, respect, and liking. The scale has been used by Tsui (1983) with acceptable reliability. A separate score was obtained from the three constituencies for the male and the female managers. The average of two respondents was used for the subordinate and the peer constituency. Again, t tests showed no differences in the mean ratings between two subordinates ($t = .16$, n.s.) and between two peers ($t = .95$, n.s.). The internal consistency reliability estimates also are presented in Table 1.

Career success was measured by nine variables. Four variables measure the manager's progress in the organization, including promotion rate, merit increase, management grade level, and the formal appraisal rating that the manager received from the hierarchical superior. The remaining five variables measure the manager's satisfaction toward the work itself, advancement, superiors, subordinates, and peers.

The promotion rate was the number of promotions that the manager had received from the organization divided by his/her company tenure. The rate instead of actual number of promotions was used because of the longer company tenure that male managers have over the female managers. Merit increase was the amount of increase as a percentage of base salary. This was considered a more meaningful measure of progress because base salary

Table 1
Differences in Performance, Affect, and Career Success
Between Male and Female Managers

Dependent Variables	Reliability ^a		Male			Female			t
	F	M	N	\bar{X}	SD	N	\bar{X}	SD	
Performance effectiveness									
Superior	.90	.84	171	5.09	1.04	66	5.23	.97	-.98
Subordinates	.83	.87	384	5.05	1.22	132	5.23	1.25	-1.49
Peers	.81	.85	302	4.98	1.18	110	5.25	.91	-2.15*
Self	.82	.75	216	4.72	1.01	78	4.75	1.08	-.20
ANOVA F				4.731***	($\omega^2 = .01$)		4.301***	($\omega^2 = .03$)	
Affective relationship									
Superior	.71	.63	179	4.18	.55	67	4.19	.56	-.18
Subordinates	.87	.80	388	4.08	.74	133	4.16	.82	-1.03
Peers	.67	.80	305	3.94	.71	111	4.03	.62	-1.21
ANOVA F				7.039***	($\omega^2 = .01$)		1.373	($\omega^2 = .00$)	
Career success									
Company performance rating			210	6.63	1.16	76	6.66	1.09	-.19
Merit increase (%)			213	9.98	3.16	72	11.88	4.22	-4.02***
Promotion rate			179	.40	.22	69	.47	.19	-2.34*
Grade level			212	1.98	.67	77	1.62	.62	3.99***
Satisfaction with work	.84	.75	216	3.91	.73	78	3.95	.82	-.47
Satisfaction with advancement	.72	.79	213	3.25	.88	77	3.58	.80	-2.92**
Satisfaction with superior	.76	.87	214	3.88	.82	76	4.09	.64	-2.02*
Satisfaction with subordinates	.81	.80	215	3.69	.77	77	3.87	.82	-1.71
Satisfaction with peers	.48	.69	216	3.99	.51	75	4.04	.45	-.79
Overall MANOVA Wilks' Lambda = .83, F = 2.36**									

^aAlpha coefficient, F = female, M = male.

* $p < .05$

** $p < .01$

*** $p < .001$

may be a function of tenure, level, and experience. A larger salary increase for women relative to men with comparable performance effectiveness may reflect the organization's effort to reduce the wage disparity between the two sexes. The middle management structure was divided further into three levels reflecting a finer differentiation of grade level. The first level consisted of position titles of vice presidents and general managers. The second level included directors and department managers. The third level was occupied primarily by section managers who had one level of management underneath them. The formal performance appraisal rating was a one-item 9-point scale used by the organization to capture the manager's overall performance in quantity, quality of work, and the accomplishment of specific objectives. Managers reported their most recent performance ratings and their most recent merit increase.

The five satisfaction scales were developed specifically for measuring managerial job satisfaction by Cellucci and DeVries (1978). One of their five scales was modified to suit the purpose of this study. Instead of measuring satisfaction with pay, this scale was replaced with a satisfaction with subordinates scale. The items for this scale mirror the two scales measuring

satisfaction with superiors and co-workers. Each scale was measured by four items. The alpha coefficients also are presented in Table 1.

Analysis

The intercorrelations among all the dependent variables were computed separately for the male and the female managers. Then, a MANOVA was performed on all the dependent variables, using sex of the managers as the grouping variable. Student *t* tests were performed on each individual dependent variable to test gender differences on the three main hypotheses. Univariate *F* tests were performed on the performance and the affective relationship variables for testing Hypotheses 1b and 2b. Two-way ANOVA was performed on the performance and affect variables to examine the effect of rater and ratee sex on the dependent variables. Finally, moderated regression was used to test the interaction effect of gender with the various demographic variables on each dependent measure. This analysis was to estimate whether differences in the dependent variables were because of the gender of the manager or the differences on the demographic variables.

Results and Discussion

The intercorrelations among the performance variables across the four raters were all smaller than .38 for both the male and the female managers. Similarly, the intercorrelations among the affect variables among the three raters were also small; all were less than .26. The intercorrelations among the four career success variables were similarly small, the largest being .36. It is only on the satisfaction variables that the largest correlation reaches .56. Overall, the pattern of intercorrelation was similar between the two sexes. Because of the low intercorrelations, the dependent variables were not combined in subsequent analyses. (Intercorrelations among all variables are available from the authors.)

The MANOVA, the *t* tests, and the univariate *F* results are summarized in Table 1. The overall multivariate effect is significant ($F = 2.36, p < .01$). This suggests that there are gender differences on the 16 dependent variables. A closer examination of the *t* values shows that the mean scores are higher for the women managers on all the variables except grade level. Of the 16 *t* values, 6 reach statistical significance. Ratings on the performance variable from peers were higher for the female than for the male managers. Women managers received larger merit increases and had a faster promotion rate than their male counterparts. They also reported a higher level of job satisfaction. These women managers, however, were at a lower grade level than the male managers. Thus, women managers were evaluated more favorably and had better affective relationships with others, contrary to that stated in Hypotheses 1 and 2. However, they were more successful in their careers than were the male managers, measured by promotion and merit increase. This supports Hypothesis 3.

Hypothesis 1a was not supported. The discrepancy in mean performance ratings was about the same for female as for the male managers. The range of the ratings for female was from 5.23 for superior ratings to 4.75 for self-ratings; it was 5.09 for superior ratings to 4.72 for self-ratings for the male managers. The magnitude of the two F values also was highly similar, with $F=4.301$ ($p<.001$) for the female ($\omega^2=.01$) and $F=4.731$ ($p<.001$) ($\omega^2=.03$) for the male managers. Hypothesis 2a also was not supported. The discrepancy in affect ratings by others was larger for the male than for the female managers. The range was from 4.18 to 3.94 for males and 4.19 to 4.03 for the females. Although the F value for the male managers' scores ($F=7.039$, $p<.001$) was much larger than the F for the female managers ($F=1.373$, n.s.), neither accounted for much variance ($\omega^2=.01$ and $.00$, respectively). Thus the discrepancy in the nature of affect expressed by superiors, subordinates, and peers toward the female managers was not different from that toward the males. Hypothesis 3a, however, was supported. There still were less women at higher organizational levels than men ($t=3.99$, $p<.001$). On the other hand, Hypothesis 3b was not supported. Women reported a higher level of job satisfaction than did the men in this sample. Specifically, they were more satisfied with advancement ($t=2.92$, $p<.01$) and with their supervisors ($t=2.02$, $p<.05$). Overall, women in this sample seemed to be more successful in their careers than men, in terms of actual promotion rate, merit rewards, and attitude toward their jobs.

Previous research has suggested that raters of different genders may evaluate male and female ratees differently. There were not enough female superiors to test the effect of superiors' sex (2 percent for male managers and 6 percent for female managers). The sex of the subordinate and the peer raters could be evaluated. The two-way ANOVA shows no rater sex main effect or rater-ratee sex interaction effect on either the performance or the affect variables. The t tests on the ratings by the male and the female raters toward the male and female managers show that female raters tend to give slightly higher ratings. However, none of the t tests was significant. Thus, such tendency may only be suggested. In brief, no significant rater sex effect was observed. Subordinates and peers are not more likely to rate the performance of the same sex ratee higher than the ratee of a different sex. They do not express more affect toward managers of the same sex than those of the opposite sex. This result corroborates the findings of Peters et al. (1983) and of Wexley and Pulakos (1982). Both of these were field studies, as was this study, which found no rater-ratee sex interaction effect on the ratee's performance levels. Because the male and the female managers differed significantly on three of the four demographic variables, it was necessary to assess whether tenure and experience may have accounted for the differences observed. Moderated regressions identified only two significant ($p<.05$) sex-demographic variable interaction effects of 48 potential interactions. Because this outcome is consistent with the level of significance, no interpretation of these interactions is warranted. In effect, there is no reliable evidence of interaction effects of sex or gender and other demographic variables upon performance ratings.

Follow-up Study

Sample

Eighteen months after the main study, all the focal managers were contacted for a follow-up survey. This follow-up survey contained primarily the career success variables. Of the 295 managers contacted, 231 managers (78 percent)—169 male (78 percent) and 62 female (79 percent) managers—responded. Data were obtained on nine career success measures.

Measures

The managers were asked to indicate the most recent formal performance appraisal ratings that they had received from their hierarchical superior. It was the same company performance variable reported in the first survey. In addition to this formal company rating, the managers were asked to rate themselves on the three items comprising the performance effectiveness variable, which also was used in the first study. The mean score was used and the internal consistency reliability estimates for this scale were $\alpha = .75$ for males and $\alpha = .77$ for females.

The managers were asked further to indicate the percentage merit increase they received in the most recent merit review. All managers had received at least one merit increase since the earlier study. Furthermore, they were asked if they had been promoted during the eighteen months between the last and the current survey. In the total group, 20 percent of the managers had been promoted at least once.

Finally, the managers responded to the 20 items measuring the 5 facets of satisfaction as were reported in the first study. The alpha coefficients were computed separately for males and females. They were $\alpha = .85$ and $\alpha = .78$ for male and female, respectively, in the satisfaction with work scale; $\alpha = .73$ and $\alpha = .82$ for the satisfaction with advancement scale; $\alpha = .84$ and $\alpha = .85$ for supervisory satisfaction; $\alpha = .87$ and $\alpha = .75$ for satisfaction with subordinates; and $\alpha = .64$ and $\alpha = .75$ for satisfaction with peers.

Analysis

A multivariate analysis of variance was performed on all the variables, except promotion, using sex of the manager as the grouping variable. The *t* tests were performed on each individual variable after a significant MANOVA *F* was obtained. Chi-square was used to test the proportion of promotions between the two sexes. Results are summarized in Table 2.

Results

Consistent with results of the first study, an overall significant MANOVA *F* ($F = 4.43$, $p < .001$) was obtained. However, most of the results were

Table 2
Differences in Performance and Satisfaction
Between Male and Female Managers
Study 2

Variables	Male (N=169)		Female (N=62)		t
	\bar{X}	SD	\bar{X}	SD	
Self-rated performance effectiveness	4.50	1.00	4.97	.84	-3.30**
Company performance rating	6.45	1.20	6.61	.94	-.93
Merit increase (%)	9.84	1.74	10.74	2.26	-3.19**
Satisfaction with work	3.83	.79	3.90	.86	-.53
Satisfaction with advancement	3.03	.95	3.38	.82	-1.83
Satisfaction with superior	3.85	.78	3.81	.81	.30
Satisfaction with subordinates	3.62	.68	3.85	.79	-2.14*
Satisfaction with peers	3.92	.54	3.83	.49	1.25
MANOVA Wilks Lambda = .85, $F=4.43^{**}$					
Promotions	33 (20%)		13 (21%)		$\chi^2=.37$, N.S.

* $p < .05$ ** $p < .001$

contrary to Hypotheses 3 and 3b. The proportion of promotions for women managers was similar to that for the male managers. The average company performance ratings were also similar between the two genders. Though nonsignificant, both the proportions of promotion and the company performance ratings were slightly higher for the female than for the male managers. Most interesting is the self-rating on performance effectiveness. Women, on the average, rated themselves higher than men ($t = -3.30$, $p < .001$). These women reported that they were meeting their own expectations regarding their roles and responsibilities. There was no difference between the two sexes on this measure in the first study ($t = -.20$, n.s.). Consistent with the results of the first study, on the average, women received a higher percentage of merit increase than did men ($t = -3.19$, $p < .001$).

Women were more satisfied than men on three of the five satisfaction measures. However, only the satisfaction with subordinates scale was significant ($t = -2.14$, $p < .05$). Some changes in the areas of satisfaction were noted over the two study periods. Job satisfaction was higher for women than men in the first study but tended toward being similar in the second study eighteen months later. In summary, the results of the follow-up study again failed to yield evidence of pro-male bias in the middle management hierarchy. Women were evaluated similarly to and promoted as rapidly as men. They reported similar if not slightly more favorable attitudes toward their jobs. Lastly, they rated themselves higher on performance effectiveness and continued to receive a larger percentage of merit increase than did their male counterparts.

Discussion and Conclusions

This field investigation did not find pro-male bias among middle managers in this organization. Women managers were rated as favorably as, if not

more than, their male counterparts. Further, they obtained similar ratings in the organization's formal performance appraisal system. The validity of the rating form, the rating procedure, management training, affirmative action guidelines, and potential rater consequences may all have contributed to the equivalence of ratings between the two sexes. These contextual factors may account for the lack of bias in the formal performance ratings that are public and subject to scrutiny by the ratees, the organization, and potential legal agents. Private ratings may be more acceptable to bias, if such bias is held by the raters. Raters in this research were guaranteed confidential responses. They also were assured of no administrative consequences to their ratings. If there was any bias, more likely it would emerge in the research ratings (DeCotiis & Petit, 1978). The lack of bias in these "private" performance ratings provided by superiors, subordinates, and peers suggest that pro-male bias may be inconsequential in middle or even in lower management, as was found in a recent study of store managers (Peters et al., 1983). Sex bias, however, may well exist in the nonmanagement level.

Nieva and Gutek (1981) suggested that bias in ratings may be more likely when the raters are unfamiliar with the ratees in that inference has to be made about the ratee based on limited information. This usually is the case in selection interviewing or in laboratory studies. Women who have advanced to the management level usually have some accumulated record of achievement. The women managers in this study averaged 9.2 years in the company and slightly over 4 years of management experience. A low level of inference is required of the raters in these situations. In this study, women were seen to be slightly more effective than the men. Possibly, these raters attributed women with a high level of competence by recognizing the extraordinary effort needed to overcome the initial barriers into the executive suite (Pheterson, Kiesler, & Goldberg, 1971). Further, the discrepancy among the ratings by superiors, subordinates, and peers was slightly smaller for women than men. These findings support earlier research showing that women are as similar to the ideal manager image as are males (Brown, 1979) and that there is no difference in motivation to manage between male and female managers (Miner, 1974).

Similarity in affect expressed by others toward the male and the female managers may indicate equivalence in social acceptance between the two sexes. Superiors like their female subordinates as much as their male subordinates. Both history of interaction and actual competence may overcome the initial discomfort with a subordinate of a different gender. Similarity in the subordinates' reactions toward the male and the female managers may also be explained by the familiarity in interactions and proven competence of the managers. Over time and with experience subordinates may come to perceive female managers to have similar levels of power or access to resources as male managers. Contrary to Hypothesis 2a, female managers were not liked less than the male managers by their peers. Several alternative explanations are possible. First, peer competition may not be

an issue in this organization if there are abundant advancement opportunities. Second, perception of competitiveness may not be related to affect toward the competitor. Third, this finding may reflect the specific culture of this corporation.

Although there was little difference between the two genders on perceived performance effectiveness and affect expressed by members of the role set, differences in the actual career accomplishments favored women in both studies. Contextual variables such as affirmative action may have led to the faster promotion and larger percentage merits received by the women managers. Unfortunately, this explanation can only be conjectured because affirmative action policies would be applied to all the women in the sample. Two or more organizations are needed for a true test of the effect of affirmative action on the success of women.

The only sex main effect was observed on the peers' affect toward the women and the women's self-expressed satisfaction with some dimensions of their jobs. Women managers reported a higher level of job satisfaction than did the men. Peers expressed a more favorable affect toward the women managers regardless of the women's backgrounds. It may be speculated that the positive affect toward the women managers in this corporation may be attributed to affirmative action policy or social desirability. Affirmative action and equal employment opportunity may have been responsible for the equivalence of performance ratings given by the organizational superiors and the faster career progress of women, but it is unclear why it would lead to favorable attitudes expressed by peers, subordinates, or superiors. If social desirability is responsible for the higher ratings given to the women managers in this study, why were similar results not found in the laboratory? Why would raters in the laboratory be less inclined to give socially desirable responses toward women than subjects in field settings? Is the difference between findings from the laboratory and from this field research because of the raters, the ratees, the settings, or other unspecified contextual variables? One study in one organization cannot give solid proof on the lack of sex bias in the work place, but this research suggests that the external validity of findings from laboratory studies should be more carefully evaluated than has been done previously. Research using student subjects and fictitious target managers may be flawed in its failure to control relevant contextual variables.

In conclusion, this research has provided further insight concerning the issue of pro-male bias in organizations. No pro-male bias was found in this study of the performance effectiveness and affect ratings given by superiors, subordinates, and peers toward managers in the middle hierarchical levels. Background and contextual variables may account for the differential level of career accomplishments between the two sexes. These findings suggest that future conceptualization and research on women in the workplace must consider such situational variables as the management level of the sample in the organization, the opportunity structure provided for men and women in the firm, the level of experience that men and women

bring to the work setting, as well as biases that may be present in the minds of the organizational members. Preliminary research has begun to identify some opportunity and social variables that differentially affect the career development of women and men (Stewart & Gudykunst, 1982). Women managers reported less satisfaction only when they perceived themselves as token hires (Chacko, 1982; Northcraft & Martin, 1982). Thus, further research should focus more on contextual variables than personal bias in evaluating the differences in performance outcome and work attitudes.

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Research Notes

FOLLOWER ATTITUDES TOWARD WOMEN AND JUDGMENTS CONCERNING PERFORMANCE BY FEMALE AND MALE LEADERS¹

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There have been several studies showing that attributions of performance on the same task will vary because of the gender of the participant (Deaux & Emswiller, 1974; Garland & Price, 1977; Rice, Bender, & Vitters, 1980; Terborg & Ilgen, 1975). The Rice et al. (1980) study, conducted at the U.S. Military Academy, showed that male cadet followers holding relatively traditional views toward women's roles in society made less favorable judgments about the causes of group and leader performance in groups led by women than in groups led by men. Conversely, male cadet followers holding relatively egalitarian views toward the roles of women made more favorable judgments about the causes of group and leader performance in groups led by women than in groups led by men.

The purpose of the present study was to determine if the laboratory results reported in the Rice et al. (1980) study of West Point cadets could be generalized to field settings involving West Point cadets. The present study was a conceptual replication of the Rice et al. study rather than a direct replication because several factors besides the settings differed between the two studies. Although all followers in the laboratory study were males, the field settings included both male and female followers. The questionnaire format was identical and many of the same attributes were considered in both studies, but the wording of the questions in the field replication was slightly different. Finally, Rice et al. used the Spence and Helmreich (1972) attitudes toward women scale (AWS) to assess beliefs regarding the roles that women should play in society at large. The present study used the Army Research Institute attitudes toward women in the military scale (ARIAWS). The ARIAWS is more limited and specific in content than the

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AWS in that the ARIAWS considers the roles of women in only one of society's institutions, the military.

In light of both the results reported by Rice et al. (1980) and the construct proposed to be measured by the ARIAWS, hypotheses were derived concerning the reactions of both male and female cadets with relatively traditional and relatively egalitarian attitudes toward the roles of women in the military. These hypotheses concern both attributional judgments and direct assessments of the leader's success.

Hypothesis 1: Followers with relatively traditional attitudes toward the roles of women in the military respond to male leaders more favorably than to female leaders. The effects are shown in terms of both attributional judgments and direct assessments of leader success.

Hypothesis 2: Followers with relatively egalitarian attitudes toward the roles of women in the military show one of two patterns: 2a) They respond to female leaders more favorably than to males in terms of both attribution judgments and direct assessments of leader success; 2b) They respond no differently to male and female leaders in terms of either attributional judgments or direct assessments of leader success.

It was necessary to offer two alternative hypotheses for the reaction of relatively egalitarian cadet followers because of the inconsistency between conceptual expectations and previous empirical results. Because followers holding egalitarian attitudes feel that women should play a role in the military more equal to that of men, followers might be expected to show no difference in the way they respond to male and female leaders. Rice et al. (1980), however, reported several effects in which male followers with egalitarian attitudes showed a significant bias favoring female leaders over male leaders. Hence Hypotheses 2a and 2b are offered.

Method

Subjects. The subjects were U.S. Military Academy cadets in leader and trainee roles at two six-week summer training programs: Cadet Basic Training (CBT) and Cadet Field Training (CFT). At CBT, necessary data were available from 692 male and 86 female followers; 711 cadets described a male squad leader and 67 described a female squad leader. At CFT, 766 male and 75 female followers provided usable responses; 726 described a male platoon leader and 115 described a female platoon leader.

ARIAWS. During the new cadet orientation period in June 1979, freshman cadets completed the ARIAWS. Sophomore cadets completed this scale in August 1978 as part of an annual data collection program. This 7-item scale was developed by Woelfel, Savell, Collins, and Bentler (1976). It assesses reactions to the roles of women in the Army: high scores reflect egalitarian attitudes (e.g., equal roles for male and female Army soldiers), and low scores reflect traditional attitudes (e.g., command roles reserved exclusively for males). Because the number of response alternatives varies across items, each item was standardized ($\bar{X} = .00$, $SD = 1.00$) before a total

scale score was calculated. The alpha coefficients (Cronbach, 1951) for this scale were .79 at CBT and .74 at CFT.

There is considerable basis for concluding that the ARIAWS is a valid measure. This scale clearly possesses content validity; the items do relate to attitudes concerning the roles of women in the military. Also, there is some test-retest reliability for the AWS using West Point cadets because there was concern about how scores might change by the end of summer training (Yoder, Rice, Adams, Priest, & Prince, 1982). In terms of empirical validity, Priest (1979) reported a correlation of .59 between the ARIAWS and the widely used and well-validated AWS developed by Spence and Helmreich (1972, 1978).

Post-Training Measures. Following the end of the 1979 summer training, cadet followers in the freshman and sophomore classes completed a questionnaire describing either their CBT squad leader or their CFT platoon leader. Six individual items were used to assess attributional judgments. The respondents indicated the extent to which each of six factors contributed to the performance of the unit. The factors were selected to include factors internal to the leader (leadership skill and the leader's hard work), factors internal to the followers (unit members' skill and hard work), and factors external to both (good luck and bad luck).

Multi-item scales were used to assess five criteria of leader success: perceived effectiveness of the unit leader (three items: alphas = .82 and .87 at CBT and CFT, respectively); perceived unit effectiveness (two items: alphas = .66 and .76); satisfaction with leader (four items: alphas = .78 and .83); satisfaction with peers (two items: alphas = .78 and .79); and satisfaction with summer assignment (three items: alphas = .61 and .64).

A technical report available from the senior author provides detailed information concerning these research settings, the roles of leaders, the data collection methods, and the psychometric properties of the post-training questionnaire (Adams, Rice, Instone, & Prince, 1980).

Results

As would be expected given the content of the ARIAWS, there were substantial respondent sex effects. In both settings, the attitudes of females were dramatically more egalitarian: CBT males versus female median = -1.24 versus 6.17, $\bar{X}(SD) = -.75(4.37)$ versus 5.42 (3.93); CFT male versus female median = -.97 versus 7.56, $\bar{X}(SD) = -.59(4.49)$ versus 6.63 (3.31). For the principal analyses, median splits on the ARIAWS distributions for each sex were used to classify cadets as relatively traditional or relatively egalitarian. The reader must attend carefully to the term "relatively" as a qualifier in this classification process. Nearly all females would be classified as egalitarian if judged on the basis of the male norms. Similarly, females classified as traditional are traditional only relative to their more egalitarian female classmates. Similar qualification is appropriate for interpretation of many male scores classified as egalitarian.

Median Split Analyses. A series of 2×2 multivariate analyses of variance were conducted with the SPSS MANOVA program (Cohen & Burns, 1978). For each of these analyses, the independent variables were leader gender and follower ARIAWS. For one-half of the analyses, the six attribution items were the criteria; and for the other half, the five leader success scores were the dependent variables. Because the ARIAWS distributions were so different for male and female followers, separate ANOVAs were conducted for each sex. Because the leadership roles at CFT and CBT are somewhat different and because previous empirical analyses of sex-linked effects often have yielded different results in these two training sites (Rice, Instone, & Adams, 1984), separate ANOVAs were conducted for each site. This analysis strategy yielded the eight separate 2×2 MANOVAs, summarized in Table 1.

Table 1
Summary of MANOVA Results

Class Year and Training Site	Gender of Followers	Dependent Variables	F Ratio and Degrees of Freedom			
			Leader Gender (A)	Follower ARIAWS (B)	A \times B	
1983 CBT	Male	Attributions	1.00 (6,387)	3.52* (6,387)	.41 (6,387)	
1983 CBT	Female	Attributions				
1982 CFT	Male	Attributions	.78 (6,473)	.96 (6,473)	1.64 (6,473)	
1982 CFT	Female	Attributions	1.14 (6,41)	.76 (6,41)	.31 (6,41)	
1983 CBT	Male	Success	.67 (5,626)	.61 (5,626)	.83 (5,626)	
1983 CBT	Female	Success	1.15 (5,68)	1.48 (5,68)	.26 (5,68)	
1982 CFT	Male	Success	3.94* (5,635)	.97 (5,635)	1.22 (5,635)	
1982 CFT	Female	Success	1.05 (5,62)	1.51 (5,62)	.80 (5,62)	

*There were no egalitarian female followers with female leaders responding to all of the attribution items; therefore this analysis could not be conducted.

* $p < .01$

The leader gender \times follower ARIAWS interaction is the effect directly relevant to the hypotheses. Not one of these interactions was statistically significant. The judgmental bias related to sex-role attitudes reported by Rice et al. (1980) in the West Point laboratory study was not conceptually replicated in either of these two West Point field settings. Egalitarian and traditional followers did not make different attributional or evaluative judgments regarding the performance of male and female leaders. Hypothesis 1 and Hypothesis 2a each predicted that judgments about leaders would be related to followers' sex-role attitudes. Neither hypothesis was supported by these results. However, the lack of such bias among egalitarian respondents is consistent with Hypothesis 2b.

Leader gender main effects. As shown in Table 1, the multivariate main effect for leader gender was significant for the leader success judgments of male followers at CFT. A closer inspection of the univariate ANOVAs for male followers did show that followers of male leaders, in comparison to followers of female leaders, were more satisfied with their peers ($p < .001$, $\bar{X} = 9.84$ vs 9.02) and with their summer training assignment ($p < .01$,

\bar{X} = 12.52 vs 11.59). These significant leader gender effects, however, did not generalize to any female follower responses, to the other training site, or to any of the attributional judgments.

Follower ARIAWS main effects. As shown in Table 1, the multivariate main effect for follower ARIAWS was significant for the attribution responses of males at CBT. The univariate ANOVAs for male followers indicated that there were significant main effects for three items: leader work ($p < .05$), good luck ($p < .05$), and bad luck ($p < .01$). Traditional male followers, relative to their egalitarian counterparts, made stronger attributional judgments on all three items, that is, traditional cadets rated each of these three factors as contributing more strongly to unit performance than did egalitarian cadets (\bar{X} 's = 3.43 vs 3.27, 2.11 vs 1.94, and 2.02 vs. 1.74, respectively). However, the significant follower ARIAWS effects did not generalize to any female follower responses, to the other training site, or to any of the leader success judgments.

Extreme Groups Analyses. The principal analyses may be limited because of the use of median splits to classify traditional and egalitarian cadets; more extreme ARIAWS scores may be necessary for the predicted bias to occur. Hence, the 2×2 MANOVAs were repeated, using only the top 20 percent and bottom 20 percent on the ARIAWS distribution. These analyses had to be limited to male followers because there were so few female followers with female leaders when using more extreme cutoff points (this is true even if top and bottom thirds are used). As the Rice et al. (1980) study was limited to male followers, these secondary analyses are quite useful for purposes of the present study even though female respondents had to be excluded. None of the four MANOVAs based on extreme scores yielded a significant interaction effect. Hence, Hypothesis 1 and Hypothesis 2a were not supported. However, the lack of differences between traditional and egalitarian male followers was consistent with Hypothesis 2b.

Discussion

The results of Rice et al. (1980) were not conceptually replicated by the present study. Using median splits on the ARIAWS scale, the predicted biases were not found in responses of either male or female followers in either of the two settings for either of the two rating categories (attributions or leader success). Even when using more extreme cutoff points for the ARIAWS, consistent support for the bias predictions was not found in male responses.

The results of the present study are best viewed in light of similar results from a parallel study of West Point cadets conducted at a third location in actual Army units during the same time (Adams, Priest, Rice, & Prince, 1980). This study involved ratings of cadets assigned to regular Army units during the summer for Cadet Troop Leadership Training (CTLT). The ARIAWS scores of the regular Army officers rating these CTLT cadets were unrelated to their attributional and evaluative judgments concerning cadet

performance. Taken together, these two studies suggest that attitudes toward the role of women in the Army as measured by the ARIAWS do not introduce a consistent and strong bias into the way male and female cadet leaders are judged by either their subordinates or their superiors in field settings.

The failure to support Hypotheses 1 and 2a cannot be attributed to methodological weaknesses concerning sample size, reliability, validity, or social desirability. The sample sizes were large enough to give those analyses considerable statistical power. Concerning the issue of reliability, the attribution measures could not be assessed because they were one-time, single item measures. However, items with nearly identical format were reliable enough to yield significant effects in the Rice et al. (1980) study. Furthermore, the present authors' previous technical report indicates that the attribution responses were significantly correlated with many of the other variables measured by the larger questionnaire in which they were contained (Adams, Rice, Instone, & Prince, 1980). Such findings attest to the reliability of the measures involved. The reported reliabilities of the ARIAWS and the several leader success measures were high enough to eliminate attenuation due to unreliability as the cause of the nonsignificant effects. Furthermore, the present study was able to produce a significant main effect in each setting; such results attest to the adequacy of these measures and the design of the study.

Turning to the issue of validity, the validity of the ARIAWS has already been defended. The authors' previous reports dealing with the questionnaire used in this study attest to the validity of the attribution and leader success measure (Adams, Rice, Instone, & Prince, 1980; Rice et al., 1984). The final methodological issue concerns social desirability, that is, faking responses to please the sponsoring institution or the researchers. The present subjects were not reluctant to provide socially undesirable responses. There was adequate variance in ARIAWS, attributional judgments, and measures of leader success. In terms of supporting the hypotheses, the problem was not a general tendency for respondents to provide socially desirable responses. Rather, the problem was that those with "undesirable" ARIAWS did not also provide "undesirable" ratings of attributions and leader success as predicted. Taken together, the results of related research and the several methodological issues just considered combine to suggest that these nonsignificant effects are not research artifacts.

The long term duration and intensity of leader-follower interactions may be a key difference accounting for the results of the present study and prior laboratory research. In the present study, leaders and followers interacted on a 24-hour per day basis over a period of several weeks; they got to know one another quite well. In contrast, the previous studies yielding bias effects have been based on either short term laboratory interactions (Rice et al., 1980) or totally hypothetical situations in which subjects responded to written scenarios concerning the actions of male or female managers (Garland & Price, 1977). The saliency of gender and sex-role stereotypes may wane over time as people are compelled to judge women based on long-term

performance and face-to-face interaction. Such speculation is fully consistent with the conclusion offered by Osborn and Vickers with regard to results of field and laboratory studies of gender and leadership. They concluded:

Artificial, short-term laboratory situations tend to elicit subject responses based on readily available stereotypes, while long-term, real-life, field settings include extensive interpersonal contact that provides subjects with a more realistic basis for their behavior. Thus, lab studies may yield deceptive data in overstating the total influence of sex stereotyping (1976, p. 447).

In addition to the general variable of time and intensity of leader-follower interaction, the particular stance taken toward sexism at the Military Academy may be relevant to the lack of bias results reported here. The lack of gender bias may reflect both the institutional encouragement of gender fairness and the preparation of the female leaders. The Academy has been sensitized to the issues of gender bias through numerous reports, workshops, and specific incidents. More importantly, the Military Academy has taken many affirmative steps to handle such problems. Several references provide reviews of such actions (Adams, 1979, 1980; Vitters, 1978).

Regarding the preparedness of the female leaders, the policy of quality of training for male and female cadets may be crucial. Women and men have gone through similar training experiences; it is not surprising that they should be judged quite comparably given this equality of background. Many situations outside the Academy environment place female leaders in positions in which they do not have a background equal to that of their male counterparts.

Insofar as follower judgments of male and female leaders are concerned, the various institutional initiatives may have had a positive effect. It appears that even those cadets with serious reservations about the appropriateness of women in the Army were able to overshadow their personal attitudes and judge female leaders on the basis of performance, not sex-role stereotypes. These findings should be comforting to scholars and practitioners devoted to understanding better the influence of sex-roles, gender, and judgments of performance.

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ADMINISTRATION SIZE AND ORGANIZATION SIZE: AN EXAMINATION OF THE LAG STRUCTURE¹

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Recent longitudinal studies of the relationship between organization size and administrative staff size (Freeman & Hannan, 1975) often have failed to replicate the findings of earlier cross-sectional research (Blau & Schoenherr, 1971). As a result, many researchers (Kimberly, 1976b) have argued that further longitudinal research is necessary.

Longitudinal analyses, however, are not without potential pitfalls (Kimberly, 1976a). One of the crucial analytical problems is the identification of an appropriate lag structure: that is, the amount of time it takes a dependent variable to respond to changes in an independent variable. However, as Freeman and Hannan have noted, "It is notoriously difficult to induce the proper lag structure from empirical analysis of a panel of observations" (1975, p. 216). In addition, there seems to be no *a priori* reason why the proper lag between two variables would be the same for all organizations, even if they are of the same organization type and even if they are observed over the same period.

In order to provide some empirical basis for understanding the lag structure of the often studied relationship between organization size and administration size, two basic questions were addressed for this paper. First, does the explanatory power of within-organization models of the administration/organization size relationship vary by the time lag of organization size? Second, given the discovery of differences among the time lag models in terms of explanatory power, can these differences be attributed to other organizational factors?

Background

In contrast with cross-sectional studies, the major benefit attributed to the use of longitudinal data for the study of organizational size and administration is the increased understanding of causal processes (Kimberly, 1976a; Meyer, 1972). Given that controlled field experiments with organizational structure often are impractical, most organizational theorists would agree that "though not a complete substitute for the experimental design,

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panel analysis goes farther toward resolving the ambiguities in causal inference than other forms of analysis" (Kessler & Greenberg, 1981, p. 26). Thus, the long standing concern of researchers with administrative economies or diseconomies of scale, or the relative adjustments of administration size to changes in the overall organization size (Blau, 1970; Parkinson, 1957), indicates that both organization size and administration size should be measured over time.

Unfortunately, the majority of longitudinal research on the relationship between organization size and administration size has been limited by relatively few data points (Freeman & Hannan, 1975). This limitation has resulted in cross-sectional research designs in which the change in size or administration over two or three data points is used as a variable for cross-sectional comparisons *between* organizational units of analysis (Ford, 1980). Although certainly more informative than single time period cross-sectional research, between-organization designs are limited in their ability to tap time-related processes of change. As such, they can be contrasted to *within*-organization designs such as that used by Ford (1980) in his study of 24 organizations over a 10-year period. With such data, Ford was able to compute regressions of administration size on organization size separately for individual organizations. His analysis allowed for a detailed investigation of the responsiveness of administration size to changes in organization size, including an assessment of administrative economies and diseconomies of scale under conditions of growth and decline for individual organizations.

The simplest time series regression analysis of Y on X uses data for the X_t and Y_t variables matched over the exact same time periods. This was the procedure used by Ford (1980) when he regressed, for the same years, administration size on organization size over 10 yearly data points. From the empirical perspective, such a model (which is called contemporaneous) assumes that administration size is affected only by organization size in the same year (Kmenta, 1971). From the substantive perspective, two possible conditions might result in the model being accurate. First, organizational decision makers delete or add administrators as an immediate reaction to the observation of a change in their organization's size. Second, prior planning by organizational decision makers results in the accurate anticipation of changes in size, with the planned adjustment of administrative staff size occurring simultaneously with the changes in organization size. However, the contemporaneous model may not be appropriate when the reaction of organizational decision makers to changes in organization size occurs not instantaneously, but at a later time period.

Unlike some other social and behavioral science fields such as marketing research and economics (Clarke, 1982; Weinberg & Weiss, 1982), and probably because there has not been a long tradition of longitudinal data analysis, organizational theorists have given only limited attention to the lag structures among their prime variables (Kimberly, 1976a). As a result, longitudinal research on organization size and administration size most often

has used contemporaneous models (Ford, 1980) even though early within-organization research (Tsouderos, 1955) suggested that administrative expenditures may lag behind changes in organization size.

The issue of identifying an appropriate lag structure is a general problem with time series data. The solution offered most often by economists (and others fortunate enough to have numerous data points) is the distributed lag model in which the dependent variable is regressed on the same independent variable lagged over more than one time period. Although there are several econometric techniques for dealing with distributed lag models (Kmenta, 1971), they probably are of limited use to organizational theorists. Longitudinal data on organizational structure seldom contain sufficient observations for examining a within-organization change with a single time lag, far be it from a distributed lag. Fortunately, there is an alternative procedure to the distributed lag model—a single lag model that is not contemporaneous. However, questions then arise regarding how to identify the appropriate single time lag between two organizational variables and whether the particular types of organizational subjects differ on this account.

With four-year colleges and universities as the organizational sample, the present study examined three within-organization single lag models over eight yearly data points: (1) contemporaneous—administration size regressed on organization size from the same year; (2) a one-year lag—administration regressed on organization size from the previous year; and (3) a two-year lag—administration regressed on organization size from two years earlier. Using R^2 as a criterion for selecting the best model for each organization, a multiple discriminant analysis then was used to examine organizational factors that led to differences among organizations in determining their particular best model.

The three models suggest a range of responses from anticipatory to reactionary as to how organizations might adjust to changes in size. Although mathematically the contemporaneous model assumes an instantaneous effect of size on administration, from the substantive perspective it was felt that this model represents the condition of accurate planning by college and university administrators. That is, because it is unlikely that colleges and universities fire and hire high level administrative staff (above the level of department chairpeople) immediately after the enrollment size is finalized for the year, this model implies that organizational decision makers accurately anticipated changes in enrollment and adjusted their staff accordingly. In contrast, the other two models represent an extension of the logic employed by Freeman (1979). In a study of school districts, he argued that a one-year time lag between size and administration was appropriate because it took into account that enrollment in one school year provided the basis for teaching and administrative hiring decisions in the next year. The models examined here allowed for a one or two-year reaction time to enrollment changes.

Method

Sample. A random sample of 200 four-year colleges and universities was selected from volumes 1 through 10 of the *Yearbook of Higher Education* (YHE) (Marquis Academic Media, 1969-1978). Missing data reduced the sample to 139 organizations with 10 yearly data points. Yearly data points were considered appropriate for colleges and universities based on the assumption that the majority of their personnel decisions regarding administrators are made on a yearly basis. In addition, although midyear dropouts and transfers may account for some changes in enrollment size, yearly changes would seem most salient for an organization with essentially a yearly cycle of input-throughput-output.

Procedure. Step 1. The first step of the analysis was to compute separately, for each of the 139 organizations, the regression of administration size on organization size using eight pairs of yearly data points. With each slope computed on data for one organization, the *within-organization* (or over time) relationship between administration size and organization size was represented.

Three equations, representing the different time lag models, were estimated for each organization: (1) contemporaneous—the number of administrators from 1971 to 1978 regressed on organization size from the same years, similar to Ford (1980); (2) one-year lag—administration size from 1971 to 1978 regressed on organization size from 1970 to 1977; (3) two-year lag—administration size from 1971 to 1978 regressed on organization size from 1969 to 1976.

In the regression analyses, organization size was represented by the full time student enrollment. Administration size was the number of full time academic administrators above the level of department chairpeople. Included in this classification were presidents/chancellors, all academic deans, and all division heads in the typical areas of college/university administration including instruction, academic affairs, student personnel, head librarian, admissions, business and finance, registrar, special programs, adult/continuing education, and research. Division head titles included vice-presidents/vice-chancellors, deans, and directors.

Given 10 years of available data, there was a tradeoff in the number of years available for the regression analyses and the number of years size could lag behind administration. Regressions over eight years allowed the one contemporaneous model and the two lagged models. Although it would have been interesting to examine lags of three or more years, it was decided that the reduction in data points would have been too prohibitive.

Logarithmic transformations (base 10) of administration size (number of administrators above the level of department chairpeople) and of the organization size (number of students) were employed. Following a procedure similar to the within-organization longitudinal study by Ford (1980), the economists' technique (Campbell & Siegel, 1967) of transforming both sides of an equation was used in order to estimate size elasticities or the

proportional changes in number of administrators responding to *proportional* changes in number of students (organization size). Transforming both sides of the equation allowed the models to represent the theoretically relevant proportional changes in administration (Blau, 1970) without using the often criticized ratio variables (Freeman & Kronenfeld, 1973; MacMillan & Daft, 1979).

Ordinary least squares (OLS) regressions were used to estimate size elasticities because only 13.2 percent of the regressions had significant autocorrelations (Durban-Watson D statistic).

Growing and declining organizations were analyzed separately because earlier research has suggested that the processes associated with organization growth and decline are not simply the reverse of each other (Ford, 1980; Freeman & Hannan, 1975). A growing organization was defined as one with a larger average size in the last five years of the study (1973-1978) than in the first five years (1969-1973). Declining organizations had a smaller average size in the last five years.

Step 2. Because regressions representing the three time lag models were computed for each organization, it was possible to estimate which model represented the "best fit" (or most appropriate lag structure) for each organization. The criterion for the selection of the best fitting model was the highest R^2 among the regression equations. Organizations were considered to have a "best" time lag model when the highest R^2 of the three time series regressions was at least .1 above the other two R^2 s. A fourth classification was used for organizations that did not meet the .1 criterion for differences in R^2 . Although .1 was an arbitrary criterion, it should be noted that it was the *minimal* separation, and the vast majority of the models were separated by more than .1.

The distribution of best model classifications was: 33.1 percent contemporaneous, 16.2 percent one-year lag, 23.4 percent two-year lag, and 27.3 percent ambiguous. A cross-tabulation of the growing and declining organizations by the best fitting lag model classification showed no significant relationship (chi-square = 2.15, $p > .5$).

Discriminant Analysis Variables. A stepwise multiple discriminant analysis was used to investigate whether several organizational characteristics discriminated among the organizations classified into the four groups. The dependent variable used in the multiple discriminant analysis was labelled "best model" and represented the categorization of all organizations into the four groups described above (contemporaneous, one-year lag, two-year lag, or ambiguous).

Because no previous research was found that examined empirically organizational factors that affect the lag structure between organization size and administration size, independent variables were selected both to represent components of organization structure used commonly in the literature (Pugh, Hickson, Hinnings, Macdonald, Turner, & Lupton, 1963) and to represent variables with theoretical links to organizational change and adaptation. However, because the data were derived from a secondary

source, the selection of variables was limited, and it was not possible to consider some potentially important structural characteristics (e.g., formalization, centralization).

Based on their prominence in Blau's (1970) theoretical work focusing on size, administration, and structural differentiation, variables representing the size of the administrative staff, size of the organization, and structural differentiation were included in the discriminant analysis. Two size measures were used for organization size and administration size. Proportional changes in total organization size and in administration staff size were examined because they represented the magnitude of change that took place in the organization during the study period. Because it is common to include the initial level of a variable when a ratio or net change in the variable over time is used in regression analyses (Dewar & Hage, 1978; Freeman & Hannan, 1975), the initial levels of organization size and administration size (size in 1971) were included in the discriminant analysis. The initial size variables represented the overall scale of operations; the change variables represented the extent of variation over time. A large base size may provide sufficient organization slack to eliminate the need to make rapid adjustments in administration size in response to changes in organization size. Extensive changes in administration size may indicate fast adjustments to organization size change; conversely, large changes in organization size may make it more difficult for quick administrative adjustments.

Although the cross-tabulation of growth and decline by the best model classifications was not significant, a dummy variable indicating growth was used to explore the effect of growth/decline on lag structures when other variables were controlled. Auspices (public ownership or control) and organizational age were considered relevant variables because earlier research on colleges and universities demonstrated that these variables are related to other structural variables (Blau, 1973). Rainey, Backoff, and Levine (1976) also have argued that public organizations are less innovative than private, a situation that may affect responses to changes in size. Because it has been hypothesized (Miles & Randolph, 1980) that organizations vary in their ability to react to changes depending on their life cycle stage, it seems possible that organizational age affects lag structures. Rubin's (1979) argument that some colleges and universities do not successfully adapt their organizational structures in response to environmental change suggested that organizational characteristics that might show a more adaptive management should be examined. If organizations with a more adaptive management are quicker to change their organizational structure, a shorter time lag in reactions of administration size to organization size would result. A measure of relative degree of top management positional reorganization was used.

Operational indicators of the variables used in the discriminant analysis are:

1. Age: The founding date subtracted from 1982.
2. Public: A dummy variable indicating that the organization was a public (as opposed to private) institution.
3. Initial size: The full time student enrollment of the college or university in 1971.
4. Delta size: The proportional change in enrollment (1978/1971).
5. Growth: A dummy variable indicating that the organization had a larger average size in the last five years of the study (1973-1978) than it did in the first five years of the study (1969-1973).
6. Initial administration size: The number of the administrators (as defined earlier) in 1971.
7. Delta administration: The proportional change in administration size (1978/1971).
8. Mean differentiation: The average number of departments from 1973 to 1978. Structural differentiation was measured from 1973 because the number of departments was not reported by the *YHE* prior to 1973.
9. Position reorganization: The total number of title changes in the academic administration positions (1969-1978).

Results

The stepwise multiple discriminant analysis had one statistically significant function ($p < .01$). Table 1 shows the rotated (varimax) standardized discriminant function coefficients for the independent variables and the group centroids (means) for each of the four categories representing the best or ambiguous time lag models.

Table 1
Rotated Standardized
Discriminant Function Coefficients
and Group Means (Centroids)

<i>Variable</i>	<i>Coefficient</i>
Delta size	1.00
Mean differentiation	.02
Position reorganization	-.03
<i>Group</i>	<i>Centroids</i>
Contemporaneous	.02
One-year lag	-.43
Two-year lag	-.17
Ambiguous	.36

Of nine possible variables, three were entered into the discriminant function. These included the proportional change in size over the eight years studied, reorganization, and the mean number of departments.

Group means (centroids) of the organization's standardized discriminant scores ($m = 0$, $sd = 1$) showed that the prime effect of the discriminant function was to distinguish between the ambiguous classification and the one-year lag classification. Nearly one standard deviation separated the two groups (mean discriminant scores = .36 and -.43, respectively). Although close to the one-year lag in discriminant space, the two-year lag best model classification was not as clearly distinguishable from the ambiguous classification.

The largest discriminant coefficient in the function was positive and produced by delta size.

Discussion and Conclusions

The major conclusion of this study is that appropriate single time lags for longitudinal studies of organizational properties may not be applicable to an entire organizational sample—even when that sample is homogeneous in terms of organizational type. In addition, if lag structures are affected by other organizational factors, then the process of conducting longitudinal research is even more complex than many authors (Kimberly, 1976a) have estimated previously. When compared to cross-sectional research, not only must more complex statistical techniques be employed but, also, researchers must take care to explore the different lag structures in their organizational samples and to investigate any variables that could potentially affect their hypothesized causal lags.

Because change in size was the lagged independent variable in the within-organization regression analyses, and because delta size was the major discriminating variable, it is suggested that the magnitude of change in an organizational characteristic may determine its lag structure. Thus, this finding gives a possible clue for developing empirical solutions to the methodological problem of identifying appropriate lag structures—focus on the extent of change in the independent or lagged variable as a potential factor influencing lag time.

The effect of delta size shows that relatively more extensive changes in size discriminated primarily between the model of no discernible pattern in the time and response to changes in organization size and the model of a one-year time lag. A less notable discrimination occurred between the ambiguous model and the two-year lag model. The relationship of delta size with the ambiguous classification could result from the existence of moderating factors that limit or enhance the responsiveness of administrative size when there is a larger degree of change in enrollment. For organizations falling into the one-year lag best model classification, it seems possible that proportionately larger changes in organization size may destabilize some organizations, inhibiting their ability to plan for changes in administrative staff size, an ability necessary to have organizational decision makers plan accurately for contemporaneous adjustments to changes in size.

Two important factors to be considered in future longitudinal research on organization size and administration size are the types of administrative

personnel studied and the possible dependence of lag structures on the nature of the organizational subjects' industry.

A volatile and competitive industry may impact on managerial planning because changes in size or volume of operations may be more difficult to anticipate; therefore, it can be hypothesized that reactive rather than proactive decisions regarding staff would result. In addition, within a keenly competitive industry, organizational slack would be minimal and excess administrators might be dangerously costly. In such an environment, it seems that personnel changes would have to be made in less than the yearly increments typical for colleges and universities.

Because researchers often find inconsistent relationships between size and administration across different categories of administrative personnel (Ford, 1980), it might be possible that different categories of administrators would show different time lags in response to changes in size. For instance, it can be hypothesized that, when the personnel component represents administrators from the top levels of the organizational hierarchy or represents administrators who are difficult to replace (such as highly trained professionals), the size of the personnel component is relatively inelastic in response to short term declines in organizational size. Such a situation would result in a relatively long time lag necessary for an accurate representation of the administration size/organization size relationship.

Finally, given the increased proclivity for longitudinal research in organizational theory, it seems that future empirical and theoretical work is necessary to address at least four questions, *the answers to which are very likely specific to the type organization studied and the variables under analysis*. These are: (1) What are the substantively meaningful lag periods for measurement (e.g., one day, one week, etc.)? (2) Given an appropriate lag period, how many periods need to be observed in order to assess change? (3) How many different lag structures are needed for an accurate description of the organizational sample? (4) What are the potential factors—both structural and environmental—that may affect the lag periods and the rapidity of change?

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CORRELATES OF VOTING BEHAVIOR IN A UNION DECERTIFICATION ELECTION

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Following several decades of neglect, behavioral scientists have recently exhibited a renewed interest in the long-standing question of why employees join unions (Brett & Hammer, 1982). Findings indicate that dissatisfaction with extrinsic rewards (wages, job security, and supervision) is the primary factor associated with employees' decision to seek union representation. On the other hand, few researchers to date have sought to investigate factors related to employee voting behavior in union decertification elections. Chafetz and Fraser (1979) reported union decertification to be related to low wage, unskilled labor, and large local unions. Anderson, Busman, and O'Reilly (1982) reported that the violation of union members' expectations and the inability of the union to deal with management were particularly important to the occurrence of decertification activity.

The scarcity of research on this topic is particularly surprising in light of the threefold increase in the number of decertification elections supervised by the National Labor Relations Board (NLRB) during the past decade. The purpose of the present study was to investigate the relationship between selected demographic and attitudinal variables and employee voting behavior in a decertification election.

Hypotheses

Based on earlier research investigating correlates of voting behavior in union representation elections and the limited research focusing on decertification elections, this study tests the following hypotheses:

Hypothesis 1: A positive relationship will be found between salary and a vote to decertify the union. This hypothesis is based on earlier research by Bigoness (1978) documenting a negative relationship between salary and vote in favor of union representation.

Hypothesis 2: A strong positive relationship is predicted between perceived union instrumentality and a vote in favor of continued union representation. Earlier research by Hammer and Berman (1981) found expected outcomes of a representation election to be the primary determinant of an individual's voting behavior.

Hypothesis 3: A favorable attitude toward unions will be positively associated with a vote against decertification. Research by Schriesheim

(1978) and others has shown a favorable attitude toward unions to be positively correlated with a vote in favor of union representation.

Hypothesis 4: Contrary to earlier assessments, dual allegiance to employer and union documented by recent research is far from a universal phenomenon (Fukami & Larson, 1982). Generally, dual loyalty has been found to exist only in situations characterized by a supportive labor-management relationship. In the present study the relationship between the union and the employing organization was regarded, for the most part, as supportive. Therefore, *it is hypothesized that organization commitment will be positively associated with a vote supporting continued union representation.*

Hypothesis 5: *Extrinsic job satisfaction will be positively correlated with a vote against union decertification. On the other hand, intrinsic job satisfaction will not be significantly related to voting behavior.* This hypothesis is based on research showing union commitment to be correlated with extrinsic satisfaction but not with intrinsic satisfaction (Brett & Hammer, 1982).

Method

Research Setting. The study was conducted at a public university in the southeastern United States with a student enrollment of approximately 30,000. Four years prior to the present study faculty members of the consolidated state university system voted to be represented by a faculty union. At the time of this representation election the bargaining unit consisted of all full time faculty members within the consolidated university system. Many faculty members at the campus at which this study was conducted expressed dissatisfaction that their campus was included within the consolidated bargaining unit. These faculty members viewed the mission of their campus to be unique and different from that of other campuses.

In 1981, as a result of lobbying efforts within the state legislature, legislation was adopted that granted faculty members at the campus under study a "window period," during which time they could determine whether or not they wished to be represented by the faculty union or be excluded from the system-wide bargaining unit.

Sample and Procedure. Approximately three weeks prior to the decertification election the researchers obtained from the university administration and the faculty union a list of faculty members included within the campus bargaining unit and thereby eligible to vote in the decertification election. This list consisted of 1,360 full time faculty members from the rank of instructor through full professor. From this list a random sample of 420 (one-third) was selected to receive the questionnaire.

The decertification election was held on campus for two consecutive days, Wednesday and Thursday. On Friday the questionnaire was mailed to the 420 randomly selected faculty members. This procedure ensured that questionnaires were received by faculty members the Monday morning after

the election had been held. In addition to receiving the questionnaire each faculty member received a stamped, self-addressed return envelope and a covering letter explaining the purpose of the study. Participants were assured that their responses would remain anonymous and that the findings of the study would be available upon request once the data analysis was completed.

Completed questionnaires were returned by 124 faculty members, resulting in a response rate of 30 percent of those surveyed. Percentages of respondents in each academic rank were as follows: full professors (29 percent), associate professors (40 percent), assistant professors (18 percent), instructors (7 percent), and other (6 percent). The distributions of academic ranks across the entire population at the time of the study were: full professors (42 percent), associate professors (33 percent), assistant professors (23 percent), and instructors (2 percent). The distribution of respondents across the 10 colleges within the university was quite similar to their representation within the bargaining unit. Of the respondents, 76 percent were tenured, 77 percent were male, the mean age was 44, and the mean academic year salary was approximately \$23,200.

Instruments. Job satisfaction. Intrinsic and extrinsic job satisfaction were measured by the short form of the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England, & Lofquist, 1967).

Organization commitment. Commitment was measured using a questionnaire developed by Porter, Steers, Mowday, and Boulian (1974). Respondents were asked to view the university at which they were employed as the focal organization in answering this scale.

Union attitude. A shortened version (10 items) of Uphoff and Dunnette's (1956) scale was used to measure the favorableness of participants' attitudes toward unions. An abbreviated version of this instrument was used to shorten the length of the questionnaire. The 10 items used were the odd numbered questions in the original 20-item instrument.

Union instrumentality. Union instrumentality was measured by an 8-item scale that assessed participants' perceptions of the extent to which the faculty union had enhanced faculty employment conditions during the period it had represented the faculty. The eight issues included: more academic freedom, tenure procedure improvements, salary increases, improved fringe benefits, improved relations between faculty and administration, enhanced faculty participation in university decision making procedures, adequate representation of the university faculty within the consolidated university system, and improved faculty support systems such as clerical support and travel funds. These instrumentality items were selected because they are items that are frequently sought by faculty unions during the collective bargaining process and are job dimensions that are frequently examined and discussed by higher educational associations such as the American Association of University Professors.

Voting behavior. Five response categories were provided: (a) I voted to continue to be represented by the faculty union; (b) I voted to discontinue being represented by the faculty union; (c) I can't remember how I voted;

(d) I was not a member of the bargaining unit; and (e) I did not vote. Of 124 respondents, 55 voted to continue to be represented by the faculty union, 57 voted to discontinue being represented by the faculty union, 6 reported that they did not vote, 3 indicated they were not members of the bargaining unit, and 3 persons failed to answer the question. A vote to decertify the union was scored a 0 and a vote to retain the union was scored a 1.

Given the small number of respondents in categories other than the first two, it was decided to limit the data analysis to respondents who voted either to retain or to decertify the union. This decision resulted in reducing the usable sample to 112. Faculty participating in the decertification election voted 52 percent to 48 percent to retain the faculty union as their collective bargaining agent. Although the outcome of the election was a narrow victory for the union, respondents to this study's questionnaire voted 50.9 percent to 49.1 percent in favor of decertification.

The questionnaire requested participants to provide selected demographic information including sex, age, college, academic rank, tenure status, and academic year salary. Academic year salary was measured based on nine categories, from "less than \$16,000" to "\$32,000 or more" with \$2,000 intervals. The upper and lower ends of the salary categories reflect the average salaries for full professors and for assistant professors at the time of the election. The average salary of respondents was approximately \$23,200. Respondents were asked to indicate which of ten listed colleges they were a member of.

Results

Given the dichotomous nature of the dependent variable in the present study, logit analysis was utilized to analyze the data. Table 1 presents scale reliabilities, chi-square statistics between the independent variables and reported voting behavior, and the logit regression analysis. The regression model was highly significant, $X^2(10) = 114.73$, $p < .0001$. The coefficient of predictive accuracy of the model was 76 percent. Contrary to the first hypothesis, no significant relationship was found between salary and voting behavior. Union instrumentality was strongly and positively related with a vote in favor of continued union representation. Similarly, the positive relationship between attitude toward unions and voting behavior supports the third hypothesis. The relationships among organization commitment, extrinsic and intrinsic job satisfaction, and voting behavior were the reverse of that predicted and not significant.

An additional finding of interest in the present study was the stronger desire of women faculty members for continued representation by the union. Given that women are a minority within most university faculties and that research has documented instances of sex discrimination against female professors, it is plausible that female faculty members may view unions as a vehicle to protect them from such discrimination.

Table 1
Logit Analysis of Faculty Voting Behavior^a
(N = 112)

<i>Predictor Variable</i>	<i>Scale Reliability</i>	<i>Chi-Square Analysis</i>	<i>β</i>
Union instrumentality	.92	11.94***	4.87***
Sex ^b	—	6.19**	-3.86**
Organization commitment	.89	3.61	-1.99
Intrinsic satisfaction	.91	3.49	-1.19
Attitude toward unions	.84	3.70*	2.54*
Age	—	1.24	.05
Salary	—	.47	-.22
Extrinsic satisfaction	.87	2.63	1.40
Tenure status ^c	—	1.61	2.67
Academic rank ^d	—	1.00	-.82

^a $\chi^2 = 114.73$, $p < .0001$

^bMen = 1; women = 0.

^cTenured = 1; untenured = 0.

^dFull Professor = 5; Associate Professor = 4; Assistant Professor = 3; Instructor = 2; Other = 1.

* $p < .05$

** $p < .01$

*** $p < .001$

Discussion

To some extent the results of the present study are generally consistent with earlier studies that investigated correlates of voting behavior in representation elections. For example, consistent with findings by Hammer and Berman (1981), perception of union instrumentality was a more powerful predictor of employee voting behavior than either personal or work content variables. Similarly, the present study supports Schriesheim's (1978) finding that a positive attitude toward unions is related to pro-union voting behavior.

On the other hand, several findings of the present study are inconsistent with expectations. Contrary to earlier research (Bigoness, 1978), salary was unrelated to voting behavior. Organization commitment and voting for the union were inversely, although not significantly, related, suggesting that the relationship between the faculty union and the university administration was not as positive as suspected.

Several findings provide additional insight into employee voting behavior not found elsewhere. Earlier studies of employee voting behavior in representation elections have consistently shown extrinsic job satisfaction to be associated with a vote in favor of union representation and intrinsic job satisfaction unrelated to voting behavior. However, results of the present study fail to support the relationship between extrinsic job satisfaction and voting behavior in a decertification election. Furthermore, these findings fail to corroborate earlier research by Bigoness (1978) and Hammer and Berman (1981) that reported a positive relationship between job content satisfaction and the voting behavior of college and university faculty members in representation elections.

Finally, for two reasons a note of caution is warranted in interpreting these findings. First, these findings are based on a response rate of 30 percent of those surveyed. Second, unfortunately, data were not available to the researchers on the demographic characteristics of the entire voting group. Although it is possible to know the distribution of faculty ranks in the bargaining unit (from official records), it does not necessarily follow that the rank distribution of those who actually voted would be the same. Thus, it is not possible to determine if the demographic characteristics of the sample and the voting population are similar.

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EVALUATING THE MANAGEMENT JOURNALS: A SECOND LOOK

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As with the journals of any enduring discipline, the management journals have developed varying images of quality or prestige. These images influence a variety of behaviors in the university setting. Faculty performance is assessed, in part, by evaluating their publications in appropriate journals. Decisions regarding salary, tenure, and rank are heavily influenced by such evaluations. Because such decisions are made by committees and administrators outside of the individual's discipline, the content of publications may be less relevant than the images of the journals in which they appear. Moreover, the intrinsic merits of journal articles may not become apparent until years after their initial publication. For a full comprehension of university performance appraisal and reward systems, therefore, one must obtain insights into the images of the journals in the various disciplines. Thus, one school of thought holds that the professional potency of overall departmental faculties and programs may be measured, in part, by their record of publications in the "best" journals (Bazley & Nickolai, 1975; Weber & Stevenson, 1981).

Aspiring journal authors, aware of assessment and reward procedures, also must concern themselves with this image phenomenon. In formulating a manuscript submission strategy, the rational author may well analyze his options in line with certain expectancy theory concepts (Vroom, 1964). He may ask how achievement of a first level outcome (acceptance of a manuscript by a specific journal) will affect the accomplishment of a second level outcome (professional status, promotion, tenure, etc.). He also will consider the probability of acceptance by the alternative journals in his field, partially a function of the supply of, and demand for, each journal's publication space—that is, the manuscript acceptance rate. A combination of these assessments may lead to a series of rough expected values (estimated values times probabilities of acceptance) and thus a manuscript submission strategy.

From a number of perspectives, therefore, the images of the management journals seem of great significance. Those who must assess publication performance rely to some extent upon such images to evaluate individual achievements. Individual faculty members, aware of such images, pattern manuscript submission strategies accordingly. Other parties external to the university (i.e., those who hire graduates or commission study

grants or seek consulting relationships) may base their decisions on records of publication in the highest prestige journals, a measure of faculty potency.

Journal prestige and perceived manuscript acceptance rates have been found to be closely related. Thus, a previous study (Coe & Weinstock, 1969) revealed a powerful $-.96$ coefficient of correlation between management journal ratings and their perceived acceptance rates, as seen through the eyes of management department chairs at AACSB accredited universities. Perhaps, then, the "best" journals are deemed such because they seem most selective, most discriminating in their editorial decision processes. Perhaps by virtue of their prestige images, they are sent many more manuscripts than are "lesser" journals. Thus, perceptions of low acceptance rates may lead to images of high quality, and vice versa. Whatever the logic, management chairs closely relate their perceptions of journal quality with the perceptions of manuscript acceptance rates.

If journal images are indeed as crucial as proposed herein, then attempts should be made to study them and to share the findings with interested publics. Although images are subjective phenomena, they can be forced to the surface for evaluation and for comparison with the images of others. They then can provide a basis for rational decision making among authors, university administrators, and committees, and other interested publics. To initiate the above processes, this study was undertaken. An earlier study (Coe & Weinstock, 1969) provides comparative data for indications of the stability of such images.

Questionnaires were sent to management department chairs (heads, coordinators, etc.) at 188 AACSB accredited institutions. Of these, 114 (60 percent) usable responses were received. Of the responding institutions, 40 offer the doctorate in business or management, and 112 offer the master's degree. The questionnaire was designed to obtain ratings by management chairs of selected management journals and to elicit estimations of the manuscript acceptance rates for these journals.

Journal Ratings

Management chairs were asked to rate the achievement of an author whose article appears in one of a list of 16 journals that carry management articles. The scoring system assigned a 9 for highest achievement by an author to 0 for lowest achievement. Thus, the respondent was asked to evaluate the merit, quality, or prestige of the journal, rather than the substance and treatment of the article.

Mean ratings for journals (Table 1) indicate that the *Administrative Science Quarterly* ranks highest, with the *Academy of Management Journal* so close in second that the difference (.1) is not statistically significant. The mean ratings were generally slightly higher throughout the list in 1982 than in 1968. The only journals whose mean ratings have fallen in the interim are the *Harvard Business Review* and the *Journal of Business*. Both are general business journals, rather than dedicated specifically to articles in

Table 1
Achievement Ratings for Selected Journals^a

Journal	1982 Achievement Ratings ^b		1968 Achievement Ratings	
	Means	Standard Deviation	Means	Standard Deviation
Administrative Science Quarterly	8.1	1.5	7.5	1.9
Academy of Management Journal	8.0	1.3	6.9	2.1
Harvard Business Review	7.8	1.5	8.2	1.5
Management Science	7.6	1.6	7.5	1.6
Operations Research	7.4	1.5	7.4	1.5
Academy of Management Review	7.3	1.6	n.a.	n.a.
Industrial and Labor Relations Review	6.9	1.5	6.4	1.8
California Management Review	6.7	1.8	6.6	1.9
Journal of Business	6.6	1.8	7.1	2.1
Long Range Planning	5.7	1.7	n.a.	n.a.
Journal of Systems Management	5.6	1.6	n.a.	n.a.
Personnel	5.4	1.7	5.2	2.0
Administrative Management	5.3	2.1	4.7	2.2
Systems and Procedures Journal	5.1	1.6	4.7	2.0
Journal of Purchasing and Materials Management	4.8	1.7	3.8	1.8
Supervisory Management	4.2	1.7	3.4	1.7

^aRatings are from 9 for highest achievement for the author of an article appearing in that journal to 0 for lowest achievement.

^bStatistical tests of the differences between means find that differences of .2 or less are not statistically significant, differences of .3 are significant at the 80 percent confidence level, and differences of .4 or more are significant at the 95 percent or higher confidence level.

n.a.: Not included in the 1968 study or did not exist at that time.

the management discipline. Management chairs' ratings of specific journals seem to be gradually converging. Standard deviations declined for the ratings of 9 of the 13 journals included in both studies; the other 4 remain essentially unchanged. Aside from these noted shifts, journal ratings and rankings have been rather stable over the 14-year period.

Because not all of the important journals could be listed in a manageable questionnaire, respondents were requested to supplement the list with additional journals that would reflect high achievement for management authors. Management chairs mentioned 60 additional journals. The two mentioned most frequently by far were *Organizational Behavior and Human Performance* (22 responses) and the *Journal of Applied Psychology* (21 responses). Comments accompanying these responses indicate extremely high achievement ratings for articles in these journals. Other journals mentioned, in order of frequency, were *Decision Sciences* (12), *Personnel Psychology* (11), *Sloan Management Review* (9), *Organizational Dynamics* (8), and the *Journal of Operations Management* (7).

Several respondents suggested whole categories of journals, such as those in strategic management, psychology, sociology, decision theory, and operations research. There often appeared a pattern to these references, some being all or largely behavioral, others decision/operations oriented, and so on. The respondent's own field of specialization probably accounts for much of his/her supplementary references and, perhaps, ratings of individual journals.

Acceptance Rates

Of crucial importance to scholarly researchers are the probabilities that submitted manuscripts will be accepted by the appropriate journal. An awareness of journal acceptance rates, as well as journal prestige ratings, should be useful in deriving a strategy for sequencing submissions for a manuscript. Such information also would appear to be of value to administrators who must evaluate the achievements of their colleagues as authors.

The 1968 study, nevertheless, found that management department chairs were not especially well informed concerning journal acceptance rates. There was a marked tendency to overestimate the acceptance rates of most listed journals. Moreover, there was virtually no correlation (.04) between perceived and actual acceptance rates. Often management chairs apparently were misled by a natural propensity to inversely correlate (-.96) imputed journal prestige with acceptance rates.

The 1982 responses reflect similar perceptual distortions. The tendency to overestimate acceptance rates persists, with perceived acceptance rates exceeding the actual for 13 of the 16 listed journals. As column 1 of Table 2 testifies, the responses again indicate a strong negative coefficient of correlation (-.95) between journals' imputed prestige or quality and their perceived acceptance rates. The coefficient of correlation between imputed

Table 2
Perceived and Actual Acceptance Rates^a
(For Unsolicited Manuscripts)

Journals ^b	1982		1968	
	Mean Perceived Acceptance Rates (%)	Actual Acceptance Rates (%)	Mean Perceived Acceptance Rates (%)	Actual Acceptance Rates (%)
Administrative Science Quarterly	17.2	<10 ^c	24	10
Academy of Management Journal	18.7	15	43	25
Harvard Business Review	15.4	<10	18	10
Management Science	19.8	15	31	40
Operations Research	20.0	10	30	30
Academy of Management Review	22.5	18	n.a.	n.a.
Industrial and Labor Relations Review	23.2	18	40	27
California Management Review	24.4	<10	29	25
Journal of Business	24.9	10	26	15
Long Range Planning	31.7	25	n.a.	n.a.
Journal of Systems Management	31.9	45	n.a.	n.a.
Personnel	32.6	25	18	20
Administrative Management	34.2	15	47	10
Systems and Procedures Journal	34.4	33	48	50
Journal of Purchasing and Materials				
Management	36.0	45	35	55
Supervisory Management	39.6	25	57	10

^aIn most instances actual acceptance rates were derived from Cabell (1981). Those not included in Cabell were supplied by journal editors.

^bListed in rank order of journal ratings from highest to lowest.

^cFor purposes of calculation, <10 is rounded to 10.

n.a.: Journal not studied or did not exist in 1968.

prestige and reported acceptance rates (Cabell, 1981) is a much lower $-.59$. Illustrative of deviations from the perceived relationship are *Administrative Management* and *Supervisory Management*, both of which are reported to have much lower acceptance rates than prestige would predict. The *California Management Review* and the *Journal of Business*, ranked numbers 8 and 9 in authorial achievement, report among the lowest acceptance rates among the 16 listed journals.

The range of acceptance rate estimates for each journal tends to be quite large. For example, the low estimate for the *Administrative Science Quarterly* is 5 percent; the high estimate is 60 percent. The low-high estimates for the *Academy of Management Journal* are 5 percent and 50 percent. There does appear to be a substantial improvement in the coefficient of correlation between perceived and actual acceptance rates, rising from $.04$ in 1968 to $.58$ in 1982. It should be noted, however, that 30 of the 114 respondents refused to estimate acceptance rates, several stating that they "have no idea," or "have no basis for estimation," or the like.

Some management chairs have perceptions of journal acceptance rates that diverge sharply from reality and from the perceptions of other chairs. For example, the mean actual acceptance rate for the 16 listed journals is 20.6 percent. The lowest mean estimate by a department chair for the same list is 6.9 percent. The highest mean estimate of acceptance rates for those journals is 56.9 percent. Such administrators evidently apply entirely disparate frames of reference when evaluating articles authored by their colleagues.

Perhaps one explanation for the tendency to overestimate acceptance rates is that the rates are falling over time. This decline in acceptance rates is particularly noticeable among the highest rated journals. Perceived acceptance rates (which also are falling) may simply lag changes in reality. Of course, another implication of this decline in acceptance rates is an increasing competition among scholars for space in the "best" journals. Evidently the growth of the management discipline and the general increase in emphasis on publication have generated an expanding flow of manuscripts to the major journals. A greater proportion must be rejected; and acceptance may be more of an achievement than before.

Summary and Conclusions

Only a few notable changes in journal ratings have occurred since 1968. Management department chairs still rate an article appearing in the *Administrative Science Quarterly* as the highest achievement by a management author, among listed journals. The *Academy of Management Journal* ranks a very close second, having risen most sharply in the eyes of management chairs. There has occurred a slight general improvement in the ratings of the listed management journals, but the two general business journals' ratings have fallen slightly. Declining dispersions around mean ratings indicate increasing concurrence among management chairs concerning individual journals.

Those who must evaluate the achievements of journal article authors may find it useful to be well informed of journal acceptance rates. There still is a tendency to overestimate journal acceptance rates, and still a tendency to assume a reliable inverse correlation between imputed journal prestige ratings and acceptance rates. Evidently it is not as easy to "crack" most major management journals as many chairs think; and that inverse correlation results from a substantial scatter in the scatter diagram. Major journals' acceptance rates have been falling over the past 14 years, and perceptions must continue to adjust to this changing reality. It probably is time for data, such as that contained in this study and in Cabell's (1981) directory, to replace subjective estimations.

The declining acceptance rates for the major management journals have several implications. The most direct is the growing experience of frustration and psychological failure among aspiring authors. A more encouraging consequence is the recent proliferation of management journals. This growth is accompanied by increasing differentiation, providing a greater capacity to accommodate manuscripts over a wider span of topics and treatments. Illustrations include several new journals in the policy/strategy discipline; also the recent introduction of the *Academy of Management Review*, dedicated to the generation of hypotheses and conceptual frameworks, rather than the empirical testing thereof, as emphasized in the *Academy of Management Journal*.

An issue that merits further study is the very concept of journal quality or prestige. What criteria are being applied by those who assess the journals? Do such criteria carry different weights at different types of institutions (i.e., those with and without doctoral programs)? Criteria for rating the journals might include: (1) prestige of the university with which the journal is affiliated; (2) prestige of the professional organization with which the journal is affiliated; (3) perceived rigor and relevance of contents; (4) reputation of the editor or editorial board; (5) age of the journal; (6) perceived acceptance rates of the journal.

The journal ratings and perceptions reported in this study reflect the perspectives of management department administrators at AACSB accredited institutions. Although this group of respondents seems to provide an appropriate combination of knowledge and administrative concern, the views of other publics also should be studied. Of particular relevance are the perceptions of research-oriented professors: those whose personal goals and professional roles require a continuing record of journal publication. Management practitioners, another possible set of respondents, probably would report quite different images of the management journals than do management professors and chairs. Not totally irrelevant are perspectives of the management journals by academics in related disciplines, to reflect the reactions of tenure and promotion committees or school-level administrators to publication records.

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PERCEPTIONS OF SOCIALLY RESPONSIBLE ACTIVITIES AND ATTITUDES: A COMPARISON OF BUSINESS SCHOOL DEANS AND CORPORATE CHIEF EXECUTIVES¹

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The responsibility of business to its larger social system has generated a great deal of discussion and writings. One useful area of research has focused on identifying and studying groups of people who are what could be termed "stakeholders" in the business sector. These are individuals who have some relationship with or influence on the leadership of large corporations and include suppliers, customers, politicians, nonpolicymaking employees, educators, and the general public. Research in this area includes many general models that have been developed as conceptual frameworks for understanding the relationships between business and its larger environment (Fitch, 1976; Sethe, 1979; Zenisek, 1979). Most are based on the premise that because the organization fits within a general societal framework, the identification and consideration of these stakeholders' beliefs must be considered as part of the philosophy and practice of corporate social responsibility.

¹The authors wish to thank Keith Davis for his kindness in reviewing the wording used in the third section of the questionnaire used in this study.

The amount of empirical research on the topic of social responsibility is not great (Arlow & Gannon, 1982). In the area of specific stakeholders, the research is limited to a very few of the many possible groups that could be influential on corporate decision makers. Ostlund (1977) compared the attitudes toward social responsibility expressed by corporate policy makers with those of a group of operating level managers. A more elaborate investigation by Sonnenfeld (1981a) covered several external groups.

A major group of external stakeholders is deans of collegiate schools of business. Because they lead institutions responsible for training future business managers as well as providing counsel to present corporate leaders, they collectively have shown a great interest in corporate social responsibility. The American Assembly of Collegiate Schools of Business (AACSB) has sponsored a number of programs, beginning as early as 1970 (Ling, 1970), in which it has sought to define the relationship of business to its social system and the way in which this topic of social responsibility should be taught. Buchholz (1979) conducted an empirical assessment of the business and society educational programs' extent and topic coverage. The results of these studies and related discussions formed the focus of conferences in 1980 (Preston, 1980) and in 1981 (Epstein & Preston, 1982).

Purpose

The purpose of this study was to compare the perceptions about corporate social responsibility of top corporate executives with the perceptions of an important external stakeholder group, business school deans. More specifically, this study sought to determine whether or not business leaders and business educators are in agreement as to what practices are evidence of socially responsible behavior, how intensely these activities are being supported by business leaders, and what arguments for and against the acceptance of corporate social responsibility have merit. The expectation was that a difference would exist in the intensity of perceived support for various socially responsible activities, but that the rankings of importance of these activities would be similar for both groups. The difference in intensity of support between the two groups may be based on the information available to each, the frame of reference in which specific actions are perceived, and other forms of role bias.

An article by Dearborne and Simon (1958) and a more recent work by Sonnenfeld (1981b) suggest that role bias may be the major contributor to differences in perceptions between top corporate officials and other stakeholders on how well business is performing in the social responsibility area. Sonnenfeld's work suggests that without other information, an executive's role bias will direct his or her behavior. In distinguishing among situational attributes in a study of price fixing, he found that the corporate groups distant from the pressures of the marketplace would tend to attribute illegal price fixing behavior to the morals and ethical standards of the people involved but those close to the situation would attribute the illegal

behaviors to the pressure of the situation. The importance of this concept to social responsibility is in predicting the attitudes of corporate executives and distinguishing them from those of stakeholders. The executives making the decisions are in the middle of the action and, by the nature of their role bias, could be expected to see the level of activity in social responsibility in a different way from those external to the organization. Although Ostlund's study found no role bias internal to the organization, there is no reason to believe that role bias would not exist in a comparison of the beliefs of top corporate officials with the beliefs of external stakeholders. This study seeks to determine the extent of this difference.

Method

A three-part questionnaire was developed and field tested as a means of gathering data for this project. The questionnaire was sent to 700 randomly selected chief executive officers listed in the *Reference Book of Corporate Management* (1981) and to 420 deans of collegiate business schools that are members of the AACSB. All questionnaires were mailed with a cover letter and a self-addressed return envelope. All replies were anonymous. Usable replies were received from 203 deans and 116 CEOs, which yielded response rates of 48 percent and 17 percent, respectively.

It is possible that response bias could have been introduced into the study. In other words, those who have a strong belief in corporate social responsibility may have been more inclined to return the questionnaire than those who do not. The possibility of this problem is pointed out, but there is no evidence to support it and reasonable precautions were taken to guard against it. Comparisons were made between characteristics of the respondents and characteristics of the population. The results show no evidence of response bias. For example, 33 percent of the respondents lived in the Northeast, 22 percent in the South, 29 percent in the Midwest, and 16 percent in the West. The corresponding figures for the total sample were 30 percent, 21 percent, 33 percent, and 16 percent. Similar comparisons were made for age and type of industry. In addition, the responses were divided into two groups; the first one-half received and the second one-half received. In general, no differences were observed between early and late respondents indicative of response bias.

The questionnaire was divided into three parts. The first part asked for background information about the respondent and the corporation or business school that he or she headed. This included personal items such as age, length of time in present job and with present employer, and academic background. For corporations, items included age of company, location, industry, and type of market in which the firm competed. For business schools, information was requested on location, age of institution, age of business school, and status of AACSB accreditation.

Part two of the questionnaire asked the respondent to indicate the degree to which he or she believed that the nation's business community supported

15 separate activities commonly associated with the practice of social responsibility. Activities included items such as support for higher education, support for charitable and philanthropic organizations, and support for environmental protection laws. The 15 items selected were those activities that are most frequently listed as representing examples of the practice of corporate social responsibility (Committee for Economic Development, 1971; Corson & Steiner, 1974; Eilbrit & Parket, 1973; Holmes, 1977; Ostlund, 1977). Each activity had three 5-point scales associated with it. The first scale asked for an indication of the degree of support believed given to that activity five years ago. The second asked for the degree to which the respondent believed that the activity is supported today, and the third asked for an indication of what he or she believed would likely be the level of support five years from now.

The third part of the questionnaire consisted of 22 statements taken from Keith Davis' (1973) classic article on social responsibility. The format, similar to that used by Ostlund (1977), utilized philosophical statements such as "Responsible corporate behavior can be in the best economic interest of the stockholders" or "If social programs add to business costs, it will make business uncompetitive in international trade" to represent argument for and against corporate acceptance of social responsibility. The respondents were asked to indicate on a 5-point scale the degree to which they agreed or disagreed with the particular argument. The questionnaire was field tested for readability, interpretation, and completeness.

Results

Arguments for and Against Corporate Social Responsibility. Table 1 presents 11 statements representing the major arguments for business assumption of corporate social responsibility; statements presenting contrary arguments are given in Table 2. The questions used a Likert-type 5-point scale. There also was a "don't know" response for each activity. Thus, the responses were dichotomized as in a procedure suggested by Edwards (1957).

The responses in Table 1 were analyzed by calculating the percentage of respondents who indicated mild or strong agreement with a statement. A similar procedure was used with the contrary statements in Table 2. Here, the numbers represent the percentage of respondents who indicated mild or strong disagreement with a statement. A chi-square test was used to determine if there was a significant difference between the responses of the deans and the responses of the CEOs for each statement. Other statistical tests were conducted to make sure that the method of testing did not alter the tenor of the conclusions drawn. The tests used were: (1) a chi-square test without combining the data (that is, leaving a 5-point scale), (b) a *t*-test for the difference between means where each response was scored from 1 to 5, and (c) a test of difference of proportions. Although there were a few differences, there was great consistency of results. It appears that the method of testing did not affect the major thrust and direction of the

Table 1
Agreement with Statements
for Corporate Acceptance of Social Responsibility

<i>Statements</i>	<i>Total Percentage of Agree Strongly and Mildly Agree</i>	
	<i>CEOs</i>	<i>Deans</i>
Responsible corporate behavior can be in the best economic interest of the stockholders.	92.2%	90.1%
Efficient production of goods and services is no longer the only thing society expects from business.	88.8	92.1
Long run success of business depends on its ability to understand that it is part of a larger society and to behave accordingly.	87.0	86.1
Involvement by business in improving its community's quality of life will also improve long run profitability.	78.4	75.7
A business that wishes to capture a favorable public image will have to show that it is socially responsible.	77.6	76.2
Social problems such as pollution control sometimes can be solved in ways that produce profits from the problem solution.	71.9	75.6
If business is more socially responsible, it will discourage additional regulation of the economic system by government.	70.7	68.3
If business delays dealing with social problems now, it may find itself increasingly occupied with bigger social issues later such that it will be unable to perform its primary business tasks.	55.2	57.4
The idea of social responsibility is needed to balance corporate power and discourage irresponsible behavior.	36.5	55.0*
Other social institutions have failed in solving social problems so business should try.	27.8	32.3
Since businesses have such a substantial amount of society's managerial and financial resources, they should be expected to solve social problems.	16.6	31.8*

* $p \leq .05$, chi-square with one degree of freedom.

conclusions drawn. A comparison of the results obtained using different testing procedures is available from the authors.

Taken together, the items in Tables 1 and 2 represent a variety of philosophical positions. Responses to the statements may reveal one or more reasons that CEOs or deans may have in viewing the proper role between business and society and perhaps may lend insight into their perceptions of levels of commitment to the various socially responsible activities.

Table 1 shows significant differences for only 2 of the 11 statements representing arguments for business assumption of social responsibility. The deans agreed much more frequently than did the CEOs that "the idea of social responsibility is needed to balance corporate power and discourage irresponsible behavior" and that "since business has such a substantial amount of society's managerial and financial resources, they should be expected to solve social problems." Apparently, there is less acceptance of corporate power by the deans than by those who actually have it. There is also a far stronger feeling by deans that resources are available in business to resolve social problems than the managers of those resources themselves believe exist.

Table 2 presents arguments against corporate assumption of social responsibility along with the percentages of deans and CEOs who mildly or strongly disagree with the arguments. There is less agreement between the

Table 2
Disagreement with Statements
Against Corporate Acceptance of Social Responsibility

Statements	Total Percentage of Mildly Disagree and Disagree Strongly	
	CEOs	Deans
Business already has too much social power and should not engage in social activities that might give it more.	77.0%	73.1%
If business does become socially involved, it will create so much friction among dissident parties that it will be unable to perform its economic mission.	69.3	77.2
A firm that ignores social responsibility can obtain a competitive advantage over a firm that does not.	69.3	44.1*
Involvement in socially responsible activities threatens business by diverting time and money away from its primary business purpose.	68.1	60.9
It is unwise to allow business to participate in social activities where there is no direct way to hold it accountable for its actions.	67.6	67.0
Business is most socially responsive when it attends strictly to its economic interests and leaves social activities to social institutions.	64.7	57.4
Business leaders are trained to manage economic institutions and not to work effectively on social issues.	60.5	49.5*
Business will become uncompetitive if it commits many economic resources to social responsibility.	49.1	47.3
If social programs add to business costs it will make business uncompetitive in international trade.	44.7	33.8*
Business will participate more actively in social responsibility in prosperous economic times than in recession.	24.6	9.0*
Consumers and the general public will bear the costs of business social involvement because businesses will pass these costs along through their pricing structure.	15.8	5.0*

* $p \leq .05$, chi-square with one degree of freedom.

two groups of respondents on these statements than there was on the previous set (Table 1); statistically significant differences were observed for five arguments. Deans were less inclined to disagree with the statements, "Business will participate more actively in social responsibility in prosperous economic times than in recession" and "Consumers and the general public will bear the cost of business social involvement because business will pass these costs along through the pricing structure." These statements reflect the classic economic assumption that social responsibility costs are additional product costs. Deans seem to have a stronger acceptance of the relevance of this economic model to socially responsible behavior than do the CEOs. Similarly, deans disagreed less frequently than CEOs that "A firm that ignores social responsibility can obtain a competitive advantage over a firm that does not" and "If social programs add to business costs it will make business uncompetitive in international trade." Finally, the CEOs have a higher level of optimism about their ability to manage these kinds of issues as effectively as economic ones than do the deans.

Overall, the two groups seem to agree on the major arguments for practicing social responsibility. Disagreements arise over perceptions of resource costs for conducting these activities and perceptions of the ability of business to make good decisions in social responsibility practices.

Table 3
Degree to Which Nation's Business Community Supports
Socially Responsible Activities Over Time:
Chief Executive Officers Versus Deans of Business Schools*

Corporate Support for	Was Five Years Ago		Is Now		Will Be in Five Years	
	CEO	Dean	CEO	Dean	CEO	Dean
Higher education	49.1%	20.5%*	65.6%	29.9%*	72.2%	50.8%*
Ethical practice codes	48.7	12.8*	70.8	35.0*	74.8	47.4*
Minority hiring and training	34.5	21.6*	52.6	33.3*	63.2	27.8*
Charitable and philanthropic	28.4	23.7	56.0	27.1*	71.1	33.7*
Pollution control	24.6	6.0*	31.6	14.4*	39.3	18.8*
Quality of work life program	22.6	11.2*	47.8	28.4*	75.7	61.6*
Building and ground beautification	22.3	13.7*	33.0	18.5*	36.7	25.6*
Environmental protection laws	20.2	3.5*	26.1	8.1*	31.5	18.2*
Community renewal and revitalization	18.9	9.3*	30.4	16.1*	43.1	22.0*
Arts and cultural	17.2	20.9	32.8	28.9	51.3	36.9*
Handicap hiring and training	13.9	4.6*	28.1	14.2*	42.3	16.1*
Minority business	11.7	7.2	17.0	8.6*	22.9	8.9*
Political action committee	11.3	18.4	40.0	41.8	60.7	54.6
Consumer protection laws	10.4	6.5	15.7	9.5	20.5	13.0
Executive loan to governments	9.3	10.0	14.8	11.6	22.9	19.1

*All numbers represent the percentage of respondents indicating considerable or extensive support for an activity.

* $p \leq .05$, chi-square with one degree of freedom.

Intensity of Commitment. Table 3 presents the 15 activities commonly associated with the practice of social responsibility along with the percentage of CEOs and deans who indicated considerable or extensive corporate support for an activity. Chi-square tests were again used to determine if there was a significant difference between the responses of the deans and CEOs. A majority of items showed statistically significant differences at the .05 level when using a corrected chi-square with one degree of freedom.

Despite the similarity of the rank orderings, there are differences between the deans' and chief executives' beliefs about the intensity of support for these activities. Of the 45 comparisons spanning the three time periods, less than one third showed no significant difference in the way these two groups viewed corporate commitment to those socially responsible activities. No differences in perceived intensity of support were observed for any time period for political action committees, consumer protection laws, and executive loans to government. No difference in perceived intensity of support was observed for charitable and philanthropic, arts and cultural, and minority business activities five years ago and arts and cultural activities today. In general, the deans perceive a substantially lesser degree of corporate support for socially responsible activities in each time period than do the CEOs. Although both groups see increasing corporate commitments to these activities over time, the deans do not see as much improvement in support for the activities as do the CEOs.

Conclusions

Both deans and CEOs recognize very similar priorities for socially responsible activities, with the CEOs having the more sanguine viewpoint. In addition, there appears to be a more skeptical perspective among the deans than the CEOs in their statements about the basis of support for social responsibility.

The conclusion about intensity of support identified something rather counterintuitive: pragmatic and pessimistic academics versus idealistic and optimistic business executives. A number of plausible reasons can be proposed to explain the differences in levels of beliefs between the two groups. Perhaps the most obvious is role bias. The responses across all three sections of the questionnaire are consistent with a belief by business leaders that they participate a great deal in socially responsible activities. The deans, on the other hand, are assessing participation on a different scale. They believe that corporate participation in these activities is considerably less. In some cases, the differences are startling. The obvious differences in perceptions between the people making decisions about allocations of society's resources and those training these decision makers make this a rather important direction for further research.

The second aspect of this finding is more positive. Although there are disagreements over level of support and some of the reasons for that support, there is a reassuringly high degree of consensus about what activities have and should have priority in the commitment of resources to social responsibility. This level of agreement not only is presently strong, but it gets stronger as business decision makers and deans look five years into the future. Apparently the perceptual gap found between these two groups in determining levels of support to these activities has not interfered with their reaching a consensus on the activities to which those resources should be committed.

The arguments for and against corporate acceptance of social responsibility also indicate the less optimistic and perhaps cynical view that deans have of business behavior. They were less accepting of corporate power and more sensitive to the costs of the business than were the CEOs. There is a far stronger belief by deans that the resources are available in business to resolve social problems, but it is the CEOs who have the higher level of optimism about their ability to manage those kinds of resources.

A final conclusion is that more research needs to be done. Although this conclusion frequently is used as an all-purpose cover in case something is missed, there is more immediacy to this statement here. The literature on social responsibility seems to be developing a certain smugness as to the degree to which agreement has been reached and disseminated on the definition of social responsibility. The results of this study could be interpreted as seriously questioning the degree of consensus between internal corporate executives and one of the many important groups of external stakeholders. It is entirely possible that the two responding groups had a different model

of social responsibility, what it looks like, and how it operates in their minds as they answered these questions. Research should be expanded to include other groups of stakeholders to determine if a similar lack of consensus exists. If so, patterns should emerge that will allow a better understanding of these differences.

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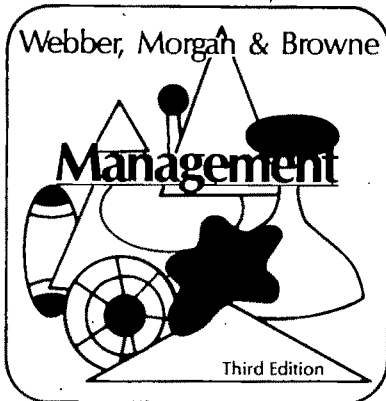
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Editorial Comment

Ending a term as editor of the *Journal*, one is tempted to take a pontifical stance, to propose directions for research and publication. The temptation is present in the available podium and strengthened by a desire to unburden oneself of irritations and frustrations which have accumulated over the editorial term. Apart from the purgative effect, it is doubtful that much else would be accomplished, however.

Balancing the irritations, one is tempted to seek credit for what has been accomplished during one's term and to exaggerate those accomplishments. In my opinion, the *Journal* has, during the last three years, continued to build upon the solid base established in earlier years. That base was substantial and has made it easier to continue development of a first-rate research journal. That basis of devotion to quality scholarship provided an opportunity, and realization of the opportunity was made possible by you, the members of the Academy, serving in roles of reviewers and authors.

Reviewers deserve special thanks for their guidance to authors. One tends to cast reviewers as "gate-keepers," but our reviewers have contributed considerably as colleagues advising authors on improved research design and presentation. Without quality reviewers worthy of trust, an editor is helpless. I am proud of our reviewers.

Finally, members active in scholarship are vital. A flow of manuscripts presenting exciting research is crucial to any research publication. Any improvement in quality of publication is ultimately dependent upon the quality of submissions. Yes, the continuing improvement of the scholarship presented in the *Journal* is ultimately dependent upon you, the scholars. The irritations of editorship fade into insignificance when one reflects upon the continuing swell of quality research submissions. I am proud of your continued record of scholarship; the Academy has justifiably earned an enviable reputation for scholarly research.

For the record, statistics summarizing the past three years of the *Journal* are presented below.

	New Manuscripts	Rejected	Under Revision	Accepted	Under Review
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1982	449	352 (78%)	23	74	0
1983	458	378 (83%)	26	54	0
1984 (1/01/84-10/17/84)	290	240 (83%)	43	5	2
1981-1984 Total	1,403	1,142 (81%)	101	158	2

I am proud of the last three years—proud of the review board, proud of the authors, and proud of the more numerous submitters of papers. While there are many possible suggestions for improvement, empirical research in the Academy is alive and thriving. I am proud of my association with this research effort.

T. M.

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The Relationships Among Beliefs, Organizational Position, and Whistle-Blowing Status: A Discriminant Analysis¹

MARCIA PARMERLEE MICELI

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Survey data from a random sample of 8,500 employees were examined to determine whether persons who report perceived organizational wrongdoing differ from other employees as to their beliefs about organizational conditions and their organizational positions. Distinct profiles of whistle-blowers, observers of wrongdoing who do not act, and nonobservers, emerged.

Many journalists have recently reported that a large auto manufacturer is embroiled in a dispute with consumers and government attorneys. The dispute concerns the safety of the brake design built into millions of its automobiles. Those opposing the design allege that drivers and passengers are seriously endangered each time they ride in these autos, and that the automaker knowingly marketed the cars without modification. If they are successful, the automaker will be forced to recall and repair each auto; pay millions of dollars in attorneys' and claimants' fees and reimbursements; and suffer a loss in consumer esteem at a time when goodwill is critical to its recovery from recent adverse business conditions. If the complainants' allegations are true, then other losses as a result of this organizational wrongdoing may include the human suffering of injured individuals and their families. Presumably, had a member of the auto manufacturing organization complained about the brake design, and had corrective action been taken, such costs could have been reduced or avoided.

¹The authors would like to thank Rufus Milsted for conducting computer analyses; the Merit Systems Protection Board—particularly John Palguta—and the National Archives, for making these data available; the Research Foundation at Ohio State University for financial support for the research; and the Center for Human Resource Research for providing support facilities. The helpful suggestions of two anonymous reviewers are appreciated.



Clearly, such cases are serious and worthy of study even if they occur infrequently. Understanding and, ultimately, controlling such events is an even more important goal if they occur frequently. Whether organizational wrongdoing is prevalent or increasing in frequency of occurrence, however, is debatable. Reliable data do not exist, for several reasons. Individuals differ in their perceptions of what constitutes wrongdoing, and some incidents of wrongdoing may go unnoticed by the public or by researchers. As an illustration, a recent series of reports appearing in the *Wall Street Journal* (Ricklefs, 1983) focused on two Gallup polls of executives and the general public. The results indicated that there was substantial disagreement as to the incidence of certain activities that the pollsters considered to be of questionable ethics, and disagreement concerning the rise or decline of ethical standards in business also was apparent.

Even if agreement on the nature and incidence of an activity exists—that is, the act is clearly illegal—it is difficult to compare the number and type of illegal activities because laws can differ from state to state and they change over time. However, there is evidence that the incidence of lawsuits filed by employees against their employers is increasing dramatically (Ewing, 1983) and that many states are now enacting legislation designed to protect whistle-blowers (Malin, 1983). Thus the issue of whistle-blowing should be of great interest to observers of organizations and their members.

Researchers' interest in organizational politics in general, and whistle-blowing in particular, has increased in recent years (Farrell & Petersen, 1982). Whistle-blowing has been investigated by such diverse groups as academicians, journalists, the federal government, "public watchdogs," attorneys, and others (Ewing, 1983; Malin, 1983; Nader, Petkas, & Blackwell, 1972; Perucci, Anderson, Schendel, & Trachtman, 1980; Peters & Branch, 1972; Weinstein, 1979; Westin, 1980). Most previous investigations have consisted primarily of compilations of anecdotal information or interviews with whistle-blowers who have made their complaints public.

Attempts to identify experiences and characteristics common to whistle-blowers have been limited (Brabeck, 1984; Hoyman & Stallworth, 1982; Near & Jensen, 1983; Near, Miceli, & Jensen, 1983; Parmelee, Near, & Jensen, 1982). These studies may have increased the understanding of what whistle-blowers believe they experience following their complaints, but still little is known about why certain individuals observe wrongdoing and choose to report it and others do not. These studies have focused primarily on women whistle-blowers and on wrongdoing in the form of sex discrimination. Male whistle-blowers, persons objecting to other types of activities, and whistle-blowers who use a channel other than a state or federal civil rights agency may have different experiences. Further, little is known about how organizational conditions may affect whether one blows the whistle.

The present study tested whether individuals' organizational positions and their beliefs and perceptions concerning organizational conditions relevant to whistle-blowing could differentiate organization members of three

types: those who did not observe wrongdoing, those who observed wrongdoing but did not report it, and those who observed wrongdoing and blew the whistle. A large, random sample of individuals employed by 15 federal agencies completed questionnaires concerning their opinions about whistle-blowing, their observations of a range of specific questionable activities, and their actions and experiences following such observations (if applicable). Their responses may suggest means through which organizations can influence the incidence of whistle-blowing; some observers have argued that greater encouragement of whistle-blowing is a desirable end (Campbell, 1981; Ewing, 1980). Because individuals' responses were taken from surveys, measures are self-reported and often perceptual in nature; the term "perceived" is omitted in order to avoid repetition.

The perceptions of whistle-blowers can be described only if there is consensus as to what constitutes whistle-blowing. Many definitions of whistle-blowing have been proposed, and the strengths and weaknesses of each have been discussed elsewhere (Elliston, 1982; Farrell & Petersen, 1982; Janis & Mann, 1977; Weinstein, 1979). For this study whistle-blowers are considered to be organization members who disclose employers' illegal, immoral, or illegitimate practices that are under the control of their employers to persons or organizations who may be able to affect action. This definition is consistent with that used by the Merit Systems Protection Board (MSPB), which collected the data used in this investigation: "employees who report illegal or wasteful activities within Government operations" (1981, Appendix B, p. 2). In the present study whistle-blowers are separated into two categories: (1) internal (whistle-blowers who use channels within the organization); and (2) external (whistle-blowers who use channels external to the organization in addition to or in lieu of internal channels).

Hypotheses

According to Near and Miceli (in press), expectancy theory provides a framework linking individuals' beliefs about organizational conditions with their motivation to act. Whistle-blowers' beliefs about the legitimacy and importance of whistle-blowing may differ from others' beliefs because they may have responded to different organizational conditions, or because their values may differ from others' because of prior experiences. Also, as Fazio and Zanna (1981) noted, direct experience strengthens the consistency between self-reported attitudes and behavior; because whistle-blowers have acted in support of whistle-blowing by definition, they should be more supportive of it in their self-reports. Thus:

H1: Whistle-blowers will be more likely to approve of whistle-blowing and to believe that whistle-blowing should receive greater encouragement than will other organizational members.

If an organization is dependent on a questionable practice, it may provide cues that whistle-blowing will be met with retaliation to the whistle-blowers (Near & Miceli, in press; Parmerlee et al., 1982) and resistance to

changing the questioned practice. Retaliation may be a powerful disincentive to whistle-blowing (Ewing, 1980; Miller, 1972). Observers of wrongdoing may perceive that a retaliatory climate exists and decline to act—or they may rationalize inaction by attributing it to an unfavorable climate.

H2: Observers of wrongdoing who do not blow the whistle will be more fearful of managerial retaliation than will whistle-blowers.

Similarly, if management appears unwilling or unable to change its questionable practices, individuals may expect that whistle-blowing will be ineffective (Near & Miceli, in press). Having encountered wrongdoing, observers may have attended more carefully to organizational cues and may have given more thought to the mechanisms by which organizations may encourage whistle-blowing. Therefore:

H3: Observers of questionable activity will be more likely than non-observers to indicate that specific incentives and/or conditions (e.g., seriousness of the activity, cash rewards, protection from retaliation, etc.) would encourage them to blow the whistle.

Organizational members who have encountered questionable activity may have a greater awareness of potential complaint channels because they have previously confronted a situation that nonobservers have not faced. Further, as Kolarska and Aldrich (1980) noted, some observers may not act simply because they do not know where to report wrongdoing.

H4: Nonobservers will report the least and whistle-blowers will report the most awareness of complaint channels.

The individual's position in the organization may influence whistle-blowing activity through providing greater opportunity to observe wrongdoing. The position also may reflect the degree of power and dependence in the employment relationship. Individuals who have more suitable employment alternatives or professional or emotional support outside the organization are less dependent on the organization than are individuals who have few alternatives or little support (Near & Miceli, in press), and the former may expect fewer risks in mounting a challenge to organizational authority. Taking a different perspective, Hoyman and Stallworth (1982) found mixed support for the notion that individuals with greater "stakes" in their jobs (e.g., more pay or seniority, single-parent status) would be more likely to file lawsuits against their employers.

H5: Organization members who are less heavily dependent on their employers, because they have high levels of pay and education (e.g., professionals) will be more likely to blow the whistle than will others.

Supervisors and incumbents in positions in which whistle-blowing is role-prescribed (that is, their job duties include searching for and reporting questionable activity—internal auditors, inspectors, and so on) may share a stronger belief that the organization will respond to "direct voice" (Kolarska & Aldrich, 1980).

H6: Organization members who use whistle-blowing channels internal to the organization will be more likely to hold supervisory positions or positions in which whistle-blowing is role-prescribed than will external whistle-blowers.

Methodological Issues

Cause-Effect Relationships

This study investigates the relationships among individuals' self-reports of their beliefs, perceptions, and overt behaviors. With cross-sectional survey data, the cause-effect relationships among these variables cannot be determined conclusively, nor is that the purpose. The objectives are to establish that certain relationships exist and to determine the direction (positive or negative) of those relationships. No previous study has established these relationships empirically, which would be an important first step in understanding the whistle-blowing process. In many areas of organizational research, significant contributions have begun with correlational research and have been refined with more sophisticated methods. It is hoped that in this relatively new area of inquiry, a similar path will develop.

A comparison group of those individuals who say that they have not observed wrongdoing is included. These nonobservers presumably have no incentive to distort their perceptions to achieve consistency with behavior and their responses may help to interpret results.

Public and Private Sector Whistle-Blowing

Data in this study were collected from public sector organization members. Public sector employees number in the millions, and organizational researchers should not ignore this subpopulation; further, because government waste and fraud affects all taxpayers, many readers should be concerned with whether whistle-blowing can help reduce costs. However, a question may be raised as to whether the present findings are relevant to private sector employees and employers. It may be that public sector whistle-blowers and other organization members differ systematically from their private sector counterparts, or that the organizations they represent differ in important ways relevant to whistle-blowing.

Generalizability is determined empirically and it cannot be demonstrated in a single study. However, for five reasons it is clear that the reliance on data gathered from public sector employees does not rule out the possibility that the findings are meaningful in private sector contexts. First, no studies are known that demonstrate the impact of differences in public and private sector environments or individual differences on whistle-blowing. Second, Malin (1983) has shown that the presumed gap between the legal protections afforded public and private sector whistle-blowers is narrowing rapidly. Third, with regard to research on differences between the sectors, organization theorists frequently have included government agencies and departments and their members in their samples, and often they have empirically demonstrated similar findings for public and private sector participants (Hall, 1963). Fourth, the organizations included here represent a wide variation in mission and goals, and they range in size from fewer than 1,000 to over

200,000 employees, which suggests that there may be greater similarity between certain of these organizations and private sector organizations than among the 15 agencies included here.

Finally, and perhaps most importantly, because the generalizability of findings is an empirical issue that can be addressed only through further, careful empirical research, it is incorrect to assume that because a subpopulation was used this subpopulation cannot represent the general population. For example, one would not assume that research using male subjects cannot provide insight into the behavior of working people in general. Therefore, it is argued that although this study uses a limited sample of participants, the extent of generalizability should be delimited only by future research.

Method

Participants and Procedure

In December 1980 the MSPB—established by the Civil Service Reform Act of 1978 to ascertain whether prohibited personnel practices were occurring in the civil service (MSPB, 1981)—sent questionnaires to the homes of approximately 13,000 employees of 15 major federal departments and agencies. These employees were selected at random from the 757,000 permanent employees of those organizations. Confidentiality was assured to the participants, and 8,587 employees completed and returned usable questionnaires, resulting in a 66 percent response rate.

Four steps taken by the MSPB may have contributed to the favorable response rate. The first two may have generated more trust that the responses would be confidential: first, the questionnaires were mailed to homes rather than offices; second, demographic data that could have been used to identify individuals evoked employee resistance during pretesting, thus certain questions concerning race, sex, age, and so on were omitted from the final questionnaire. Third, a follow-up postcard was mailed about one week after the first mailing. The postcard may have served as a reminder; also, several hundred persons who received postcards called the MSPB to say they had not received questionnaires, which were then mailed to them.

Fourth, the cover letter sent with the questionnaire emphasized: (a) confidentiality of responses; (b) the importance of the responses (i.e., they will be used in determining the course of forming future organizational and possibly legal policy concerning whistle-blowing), (c) assurance to persons who had not observed or reported wrongdoing that their responses were essential also.

Group Variable: Type of Employee

Employees were classified according to their responses on three questionnaire items. They were asked, "regardless of whether or not it is part of your job, *during the last 12 months*, have you *personally observed* or

obtained *direct evidence* of any of the following activities?" followed by a list of 9 descriptions of such activities as "employee(s) giving unfair advantage to a particular contractor, consultant or vendor"; "waste of federal funds caused by buying unnecessary or deficient goods or services"; and a tenth, "other," category. Respondents who did not check "yes" to any of these were classified as nonobservers. Those who checked "yes" to one or more of these and who responded "no" to a second item, "did you report this activity to any individual or group?" were classified as inactive observers. Respondents who checked "yes" to any response for the observation item and who checked "yes" in response to the second item were classified as whistle-blowers.

Whistle-blowers were subdivided further into internal and external channel categories, according to their responses to a third question, "did you report this activity to any of the following?" If the respondent checked any or all of the following, but no other response, she/he was classified as an internal whistle-blower ("internal"): "co-workers," "immediate supervisor," "someone above my immediate supervisor," "the personnel office," "the office of the Inspector General or the IG 'Hot Line' within this agency." External whistle-blowers ("externals") checked any or all of these and at least one other response: "a union representative," "the Special Counsel within the Merit Systems Protection Board," "the General Accounting Office," "a Member of Congress," "a member of the news media." Approximately 88 of the externals also checked an internal channel response.

Discriminating Variables

"Belief" Variables. Selected for use in the analysis were 20 items asked of all respondents. These items concerned respondents' (1) perceptions of existing organizational conditions; (2) ratings concerning the desirability of these conditions; and (3) beliefs about how whistle-blowing could be encouraged.

A preliminary factor analysis was conducted, so that conceptually and empirically similar items could be grouped together, reducing the number of variables and facilitating interpretation of the discriminant analysis to be performed. A principal components solution with varimax rotation was derived. Factors with eigenvalues greater than 1 were subjected to further analysis. Results of this procedure revealed that four factors (on which more than one item loaded highly) could be extracted (details are available from the authors).

The first factor appeared to represent the degree to which the respondent felt knowledgeable concerning whistle-blowing channels. The standard scores of the five items loading on this scale were multiplied by the corresponding factor score coefficient and summed. Cronbach's alpha for the resulting scale, knowledge of channels, was .78. The second factor seemed to represent the extent to which the respondents believed that the climate in the organization was not retaliatory; that is, the extent to which they felt

protected from retaliation were they to blow the whistle. The five items were combined in the manner described earlier; Cronbach's alpha for the protection from retaliation scale was .67. The third factor represented the extent to which the respondent approved of whistle-blowing as a class of behavior. The three items were combined in the manner described earlier; Cronbach's alpha for the approval of whistle-blowing scale was .69. The fourth factor reflected the degree to which the respondent weighed the seriousness of the hypothetical wrongdoing versus a need to be protected from retaliation. The two items were combined as described, except that the coefficient for the "protection" item was negative; high scores indicated that the respondent said that knowing an observed activity involved serious wrongdoing was important in motivating her/him to blow the whistle, whereas, knowing she/he would be protected was not important. Cronbach's alpha for the social concern scale was .59.

The remaining six items that loaded alone on one factor or that did not load on any factor were eligible for entry in the discriminant analysis as single-item variables.

"Position" Variables. All respondents were asked to indicate their pay level ("pay level of respondent": 1=Grades 1-4; 2=Grades 5-8; 3=Grades 9-12; 4=Grades 13-15; 5=Over Grade 15; "other" responses were deemed missing); whether they wrote performance appraisals for other employees and therefore were likely to be supervisors ("respondent is a supervisor": 1=no; 2=yes); whether they worked in a headquarters or field location ("respondent is a field employee": 1=HQ; 2=Field); and their level of education ("education level of respondent": 1=less than a high school diploma; 2=high school diploma or graduate equivalency degree; 3=high school diploma plus some college or technical training; 4=graduated from college (B.A., B.S., or other Bachelor's degree); 5=graduate or professional degree). A fifth control variable ("respondent is an inspector") was created, using the responses to: "Some employees are aware of illegal or wasteful activities because it is part of their job to know about such things. a. Does your job require you to conduct or assist in audits, investigations, program evaluations, or inspections for your agency? b. Do you work in an Office of Inspector General?". This variable was coded 1 if neither was answered affirmatively, and 2 if either was.

Analyses

The Statistical Package for the Social Sciences (SPSS) discriminant analysis procedure was used (Hull & Nie, 1981). One half of the cases were held out at random from the initial analysis to allow for testing the power of the discriminant functions to classify cases. The discriminant variables were entered stepwise according to the Wilks' lambda criterion. Stepwise analysis was used because the discriminant variables were not known from previous research to be related to the group variable. Functions having lambdas significant at .05 or less were rotated, using varimax rotation, to aid in the

interpretation of the functions' meaning; these functions were utilized for classifying holdout cases. Bayesian prior probability specification was used during classification to adjust for the differences in sizes of the groups. Tatsuka's (1970) coefficient of discriminant power was computed.

One-way ANOVAs (with type of employee as the factor) and Pearson pairwise correlation coefficients also were computed to aid in interpreting results.

Results

The discriminant analysis revealed that the first discriminant function had an eigenvalue of .151, accounting for 80.05 percent of the variance, with a canonical correlation of .362. Eigenvalues for the remaining two functions were .029 and .008; percentages of explained variance were 15.79 and 4.16; canonical correlations were .170 and .088, respectively. Wilks' lambdas prior to extraction of each function were .837, .963, and .992, respectively. The first two lambdas were significant at .0001 or less; the last was significant at .002. The coefficient of discriminant power was .162.

Differences Among Subgroups

Results of the rotation of the significant discriminant functions are reported in Table 1. Inspection of these results and the results of the one-way ANOVAs (Table 2) allowed testing of the hypotheses. (Pearson correlation

Table 1
Results of Discriminant Analysis^a
(*N* = 3,585)

Variable	Functions		
	1	2	3
<i>Canonical Discriminant Functions Evaluated at Group Means (Centroids)</i>			
Nonobservers	.317	-.144	-.031
Inactive observers	-.417	.048	.138
Internal whistle-blowers	-.262	.548	-.144
External whistle-blowers	-.702	.088	-.562
<i>Rotated Standardized Discriminant Function Coefficients</i>			
Factor 2: Protection from retaliation	.927	-.009	-.000
Financial incentives are appropriate	-.151	-.075	-.035
Respondent is an inspector	-.116	.725	.087
Respondent is a supervisor	.144	.390	.186
Factor 3: Approval of whistle-blowing	-.064	.250	-.206
Anonymity would encourage me to whistle-blow	-.040	-.209	.449
Others' approval would encourage	.056	.212	.428
Pay level of respondent	-.062	-.120	-.404
Financial incentives would encourage me	-.010	.040	.366
Factor 1: Knowledge of channels	.035	-.087	-.355
Education level of respondent	-.103	.281	.286
Corrective action would encourage me	-.170	-.071	-.241

^aItems are paraphrased because of space limitations. Of the 8,587 possible cases, 328 were excluded because of missing values on variables used to create the "group" variable; 1,073 were excluded because of missing discriminating variables; 3,601 were held out (randomly) to be used in later classification.

Table 2
Means, Standard Deviations and Results of One-Way ANOVAs

Variable	Type of Employee ^a				F
	1	2	3	4	
Factor 3: Approval of whistle-blowing	-.05 (.82)	-.01 (.76)	.12 (.67)	.13 (.63)	12.7***
Factor 2: Protection from retaliation	.24 (.83)	-.30 (.76)	-.20 (.85)	-.53 (.72)	277.2***
Financial incentives are appropriate	2.73 (1.36)	2.90 (1.40)	2.89 (1.43)	2.88 (1.58)	9.2***
Anonymity would encourage me to blow the whistle	.28 (.45)	.31 (.46)	.21 (.41)	.14 (.35)	15.0***
Corrective action would encourage me to report	.77 (.42)	.80 (.40)	.85 (.36)	.90 (.30)	12.8***
Financial incentives would encourage me to report	.02 (.13)	.03 (.17)	.02 (.13)	.02 (.11)	5.6**
Others' approval would encourage me to report	.08 (.27)	.08 (.28)	.08 (.28)	.02 (.14)	3.0*
Factor 4: Social concern	.07 (1.09)	-.11 (1.02)	-.07 (1.06)	-.15 (1.05)	17.14***
Factor 1: Knowledge of channels	.03 (.88)	-.11 (.86)	.15 (.89)	.04 (.94)	21.9***
Respondent is an inspector	1.22 (.41)	1.31 (.46)	1.48 (.50)	1.34 (.48)	97.2***
Pay level of respondent	2.74 (.99)	2.86 (.91)	3.03 (.88)	3.16 (.92)	33.7***
Respondent is a supervisor	1.23 (.42)	1.23 (.42)	1.33 (.47)	1.21 (.41)	14.6***
Respondent is employed in a field location	1.75 (.42)	1.73 (.44)	1.77 (.42)	1.75 (.44)	2.1
Education level of respondent	3.42 (1.06)	3.66 (.97)	3.83 (.88)	3.69 (.94)	58.4***

^aNs range from 7,656 to 8,259. Standard deviations are in parentheses. Code for type of employee: 1=nonobserver; 2=inactive observer; 3=internal whistle-blower; 4=external whistle-blower.

* $p < .05$

** $p < .001$

*** $p < .0001$

coefficients are not reported except where essential because—due to the large sample size—nearly every variable pair was significantly related. No r^2 exceeded .32, however, and most were less than .01.)

The function explaining the most variance separated the nonobservers from the other groups. Nonobservers were: (1) more likely to believe they would not be retaliated against after filing a whistle-blowing complaint; (2) less likely to state that knowing the organization would take action on a complaint would motivate them; (3) less likely to agree that financial incentives for whistle-blowing were desirable.

The second function differentiated internal whistle-blowers from the other groups. Internals were: (1) more likely to be highly educated supervisors and/or employees in positions for which whistle-blowing was role-prescribed; (2) more strongly approving of whistle-blowing; (3) more likely to report that knowing others would not think badly of them would encourage them to blow the whistle; and (4) less convinced that anonymity would encourage them to blow the whistle than were other employees.

The third function differentiated external channel whistle-blowers from the other groups. These whistle-blowers: (1) reported higher pay levels in combination with lower education levels and were less likely to be in supervisory positions; (2) were less likely to believe that anonymity, approval of other organization members, and financial incentives would encourage them to blow the whistle; (3) believed that they had more knowledge of where to report wrongdoing; (4) were more likely to believe that knowing the organization would take action on their complaint would motivate them; (5) were more approving of whistle-blowing than were other organization members.

The classification analysis, in Table 3, revealed that approximately 60 percent of the cases not used in the discriminant analysis could be correctly classified. The functions were most successful at classifying the nonobservers. Table 3 also shows that, of those individuals who were not excluded because of missing data on discriminant items, about half ($n=3,994$) of the respondents observed *no* wrongdoing on the part of their agency. Of those who observed wrongdoing, over half did not report it ($n=2,272$). Among those who reported wrongdoing, over two-thirds used internal complaint channels exclusively ($n=831$); only 139 respondents used external channels.

Table 3
Results of Classification Analysis

Actual Group	N of Cases	Predicted Group Membership			
		1	2	3	4
<i>Cases Selected for Use in the Analysis^a</i>					
Nonobserver	1,990	1,692	295	3	0
		85.0%	14.8%	.2%	
Inactive observer	1,145	688	453	4	0
		60.1%	39.6%	.3%	
Internal whistle-blower	411	236	168	7	0
		57.4%	40.9%	1.7%	
External whistle-blower	68	38	29	1	0
		55.4%	42.6%	1.5%	
<i>Cases Not Selected for Use in the Analysis^b</i>					
Nonobserver	2,004	1,693	306	5	0
		84.5%	15.3%	.2%	
Inactive observer	1,127	675	447	5	0
		59.9%	39.7%	.4%	
Internal whistle-blower	420	239	174	7	0
		56.9%	41.4%	1.7%	
External whistle-blower	71	40	30	1	0
		56.3%	42.3%	1.4%	

^aPercent of "grouped" cases correctly classified: 59.55%.

^bPercent of "grouped" cases correctly classified: 59.28%.

Testing the Hypotheses

Hypothesis 1 was supported. Functions 1 and 3 (Table 1) and the one-way results (Table 2) showed that whistle-blowers did believe more strongly than did nonobservers and inactive observers that whistle-blowing was desirable.

The zero-order group means suggested that Hypothesis 2 would be disconfirmed: externals were *less* confident that they would escape retaliation from first-line or higher level managers than were inactive observers. However, no single function differentiated inactive observers from whistle-blowers. Function 1 and the group means showed that observers of wrongdoing—regardless of whether they acted on it—perceived a more retaliatory climate than did nonobservers. Thus, Hypothesis 2 was not supported, but perceived retaliatory climate did distinguish the observers of wrongdoing from the nonobservers.

Mixed support for Hypothesis 3 emerged. As predicted, observers of wrongdoing were more supportive of the use of cash incentives for whistle-blowing and said that they were more likely to blow the whistle if they believed corrective action would be taken, than were nonobservers (Function 1 and Table 2). However, the relationships between four other conditions that might encourage whistle-blowing and whistle-blowing status were more complex (Functions 2 and 3).

Hypothesis 4 received partial support. The zero order means revealed that internals were the most knowledgeable, followed by externals, then nonobservers, and finally inactive observers. The hypothesis had suggested that the order would be: internals and externals, followed by inactive observers, then nonobservers. Function 3 showed that externals (who with few exceptions notified persons inside as well as outside the organization) were more knowledgeable about channels than were other groups. However, differences between nonobservers and inactive observers did not emerge. Internals were not necessarily more knowledgeable than were other members. Thus, when all variables were considered, it appeared that external whistle-blowers tended to be more knowledgeable than others.

Divining support for the fifth hypothesis was complex. Pay and education levels were highly correlated ($r = .56; p < .0001$). The mean levels of pay for each type of whistle-blower were higher than the mean levels for nonobservers and for inactive observers; nonobservers had the lowest mean education levels, with the inactive observers ranking between them and the whistle-blowers (see Table 2). This suggested that, as predicted, whistle-blowers tended to have higher levels of pay and education than did nonobservers and inactive observers. However, when all eligible variables entered the discriminant analysis: (1) internals reported higher levels of education than other employees but no additional variance was explained by pay (Function 2); (2) education appeared to act as a suppressor variable in Functions 2 and 3 because externals were differentiated from others by higher pay but *lower* education. This suggests that externals were employees of high seniority (they tended not to be supervisors) who had attained high rates of pay in spite of little education; this would imply that they were more, rather than less, dependent on the organization. Therefore, the relationship between pay, education, seniority, supervisory status, and the individual's propensity to blow the whistle was more complex than hypothesized.

Although no function directly contrasted internals with externals to test Hypothesis 6, internals were more likely to be inspectors and supervisors than were others (Function 2), and externals were less likely to be supervisors and no more likely to be inspectors than were other employees (Function 3). Thus, Hypothesis 6 was strongly supported.

Discussion

The findings suggested that preliminary profiles of four broad categories of organizational members can be drawn. These categories include: (1) individuals who do not observe wrongdoing; (2) individuals who observe but do not report wrongdoing; (3) individuals who observe and report wrongdoing through internal channels only; and (4) individuals who observe and report wrongdoing through both internal and external channels.

Profiles of Organizational Members

Organization members who had not observed wrongdoing did not seem to have strong opinions about what might encourage them to blow the whistle and probably had not given it much thought; in their speculation about what would encourage them to blow the whistle, they tended to downplay the role of an organization's encouragement of whistle-blowing through its responsiveness to complaints and providing of financial incentives to would-be whistle-blowers. They were confident that they would not experience managerial retaliation if they blew the whistle and that whistle-blowers received adequate encouragement and protection. Although they tended to be lower paid and in some cases less well educated than whistle-blowers, they were not different from inactive observers in that respect; they were not necessarily less likely than inactive observers to hold positions in which whistle-blowing was role-prescribed. These findings suggest that the opportunity for observation of wrongdoing is not highly limited.

Among those who did observe wrongdoing, the characteristics of both the observer and the situation predicted who would blow the whistle. Inactive observers tended to be supervisors, having low pay but high education; it therefore is speculated that inactive observers are likely to be young, high potential, low seniority employees. They seem to be the "fast-trackers." Of course, because complete information concerning individual characteristics (specifically, years of service, age, job titles, and performance ratings) is not on hand, the speculation is highly tentative, especially given that at least one previous investigation showed that female whistle-blowers were likely to be younger than the average worker in the female work force (Parmerlee et al., 1982). However, these characteristics may help to explain why, in this sample, inactive observers were reluctant to blow the whistle unless certain conditions were met. Because their employers could quite easily replace them, their relative power in the situation was quite low. Although they may have more suitable employment alternatives than would whistle-blowers, they may

not have wished to jeopardize their good but fragile reputations or begin again to gain favor in other organizations. Thus, compared to whistle-blowers, inactive observers would be more likely to require that circumstances surrounding future incidents guarantee anonymity, ostensibly because they did not believe that protecting a named whistle-blower from reprisal was possible.

Relative to external whistle-blowers, inactive observers also would appear to weigh the potential costs of co-worker ostracism and the monetary benefits of financial incentives. Further, these apparent "fast-trackers" had less knowledge of channels than did externals, but they did not differ from internals or nonobservers in that regard when effects of other variables were taken into account. It may be that they were less aware of channels because they had less experience with the organization. More research is needed to determine whether increasing the awareness of inactive observers as to channels would encourage them to report wrongdoing; or whether such individuals tend to rationalize inaction by understating their awareness of reporting channels.

Whistle-blowers who did not use external channels tended to be powerful organization members relative to other employees and relative to their employers. They were highly educated, and they held supervisory positions and/or positions for which internal whistle-blowing was role-prescribed. Although their willingness to blow the whistle may be ascribed to their status as professionals, and the possibility that they adhere to professional standards of ethics, no variable clearly measured this. However, internals' position characteristics may explain why—although they were as fearful of retaliation from their superiors as were other observers of wrongdoing—they claimed not to be influenced by the environmental incentives for whistle-blowing, such as guaranteed anonymity, cash, or organizational responsiveness to the complaint. One environmental incentive they did acknowledge was that of others' approval; it may be that internals believe that blowing the whistle inside the organization will be less threatening to others than external whistle-blowing.

Like other whistle-blowers, internals tended to have a stronger belief in the desirability of whistle-blowing. Whistle-blowers may differ from observers who do not act as to their personal codes of ethics regarding reporting and failure to report; this may enable whistle-blowers to withstand threatened and actual retaliation. Brabeck (1984) has provided preliminary evidence that internal whistle-blowers indeed have higher levels of moral reasoning than do inactive observers. Future research should attempt to determine whether these attitudes and standards exist prior to whistle-blowing behavior or whether they result from it.

Whistle-blowers who used external channels alone or in addition to internal channels, in contrast, tended to be employed in nonsupervisory positions and to receive high pay in spite of their low education. Such characteristics suggest either (a) a group of more senior, probably older employees who may have received larger salaries because they had been with the agency

for some time or (b) a group of professional or technical staff who receive higher salaries because of their skills or performance. However, the second possibility seems less likely because of the negative relationship between education and whistle-blowing status when the effects of pay were controlled. On the face of it, these whistle-blowers would seem to be dependent on their employers, in the sense that they probably could not find comparable positions with other organizations; rewards for seniority often are organization-specific (Gordon & Fitzgibbons, 1982). Yet the organization also probably is dependent on them, as reflected by their pay level, because it would be difficult to replace them with employees of comparable experience. In this case, the relative power (Pfeffer & Salancik, 1978) of the whistle-blowers may still be high.

The power-dependency relationships between whistle-blowers and their employers may explain why they believed their willingness to act was largely unaffected by conditions surrounding future observed wrongdoing. The majority of members in all groups noted the importance of knowing that the organization would take action to stop the wrongdoing (MSPB, 1981); thus the perceived efficacy of the complaint action seems to be an overwhelmingly important factor. However, this condition still separated the whistle-blowers from the nonobservers. Further, whistle-blowers were not more likely to perceive that a retaliatory climate existed than were inactive observers. These findings support previous research showing that the perceived change in managerial attitudes towards the wrongdoing was more closely associated with whistle-blowers' perceptions of effective complaint action than was retaliation (Near & Jensen, 1983; Near et al., 1983).

External whistle-blowers, nearly all of whom also used internal channels, reported greater knowledge of complaint channels than did other groups. As implied earlier, this may result from their being more fully integrated into the organization as a consequence of their longer tenure. One cannot report wrongdoing using a channel of which one is not aware; thus it is likely that the knowledge of channels plays some role in determining whether one would act. However, it also is possible that one learns about channels while using them, and this greater awareness was also a consequence of whistle-blowing. Future pretest, posttest design research could examine different organization practices in raising awareness, to determine the cause-effect relationships.

Limitations and Suggestions for Future Research

The generalizability of the findings here should be tested. Whistle-blowers whose actions have been reported in the mass media generally used external channels, but few respondents in this sample did. This may reflect one of the shortcomings of case analysis—that external whistle-blowers, seen by the media and the public as perhaps the most important or common type of organization dissident, are in fact a small proportion of organizational members and of observers of wrongdoing. Alternatively, the sample

may simply show the impact of the policies encouraging internal whistle-blowing and the extensive network of internal channels available to whistle-blowers in federal agencies.

Elliston (1982) has suggested that there may be several types of internal complainants: (1) those who inform supervisors (and, presumably, co-workers), and who therefore do not violate the chain of command; (2) those who do not inform their supervisors, but go directly to higher levels of management; (3) those who sidestep line management and inform the personnel department or another internal unit in the organization. According to Elliston, complainants who do not report wrongdoing to their supervisors in effect "blow the whistle" on their supervisors, and their action may result in consequences very different from those of the actions of other complainants. The design in the present study lumped together all types of internal whistle-blowers; further investigation is needed to determine whether Elliston's hypothesis is correct. Further, federal employees who complain to the press or the Congress may also differ from those who utilize the MSPB, the General Accounting Office, or union grievance channels, which may be seen by management as more legitimate (and perhaps less public and less threatening) channels for dispute resolution. The unit of analysis needs to be considered: "going public" may entail going outside one's department or it may involve going outside the organization.

External whistle-blowers present an interesting case because they tend to use both external and internal channels for whistle-blowing. The MSPB survey did not include questions concerning the sequence of dual whistle-blowers' decisions—whether they first tried internal channels, experienced retaliation and/or a lack of attention to the complaint, then decided to "go external"—a process Kolarska and Aldrich (1980) anticipated. Investigators might wish to focus attention on how channel decisions are made and what organizational conditions may influence them.

Classification analysis revealed that, though employees' perceptions of organizational conditions and some variables relating to their organizational position separated various types of whistle-blowers from other members, a substantial amount of variation remained to be explained. Other variables, such as those pertaining to the circumstances surrounding an observed questionable activity, personality characteristics, the level of support a would-be whistle-blower received from family and friends, and the actual consequences of previous complaints, as well as organizational variables such as policies toward whistle-blowing, may play important roles and could be included in future investigations.

Although this unusual sample provided a helpful comparison group of persons who reported that they had not observed wrongdoing, it is possible that some had in fact observed suspicious activity but, not wanting to act on it, they distorted their perceptions of what they had observed. The possibility of bias always is an issue when self-reports are used as data. For future research, it is recommended: (1) that multiple data sources be used to obtain independent measures of critical variables; and (2) that random

samples and comparison groups be used. The latter aided in the interpretation of the results in the present study. However, it is believed that the self-reported data here make an important contribution, in spite of the potential bias. First, few studies have systematically investigated the whistle-blowing phenomenon, and this study should be viewed as one of the first attempts to demonstrate empirically relationships that may have been thought to exist previously. Second, several of the key variables could have been verified through records, had the MSPB not guaranteed confidentiality. It is not likely that employees completing an anonymous questionnaire would deliberately or unconsciously distort such factual information as grade level, whether they wrote performance appraisals for others, level of education, and so on. There was no apparent motivation to do so. An employee not wishing to share that information would simply not share it.

Third, with regard to beliefs about the value and process of whistle-blowing, although self-report data may be flawed, it is not known how better data can be obtained practically. Although organizations may encourage or discourage wrongdoing through observable or measurable activities, such sensitive data would be difficult to collect. Further, a program to increase awareness of channels, for example, may not have the desired impact; one would need to measure awareness through self-reports to know. Therefore, although the potential for percept-percept biases resulting from a common method of data collection cannot be ignored, it is considered to be a minor problem with regard to some of the variables and the "lesser of evils" with regard to other methodological problems. Further research is encouraged to clarify the relationships suggested here.

As noted earlier, this study did not investigate cause-effect relations among individuals' beliefs and position power, organizational conditions, and whistle-blowing. Critical questions remain to be answered, but opportunities for controlled longitudinal study or manipulations in field settings are virtually nonexistent, because of the sensitive nature of the phenomenon. Laboratory investigation may be an important first step in determining cause-effect relationships.

Conclusion

The primary difference between observers of perceived organizational wrongdoing who blow the whistle and observers who do not seems to be that the latter are unwilling to jeopardize their careers by reporting wrongdoing; further, they feel so strongly on this matter that they are unlikely to believe assurances of protection. Thus, policy changes to protect whistle-blowers against reprisal short of guaranteeing anonymity are unlikely to affect the behavior of this group; however, providing convincing evidence that corrective action would be taken appears to be important to nearly all potential whistle-blowers. Such policies, however, would encourage the whistle-blowing of external whistle-blowers who are less fearful after having once blown the whistle. Ewing (1983) has argued eloquently that whistle-blowing

will increase in future years and that valid whistle-blowing should be encouraged, because it improves organization operations through its corrective action. Present results indicate that finding the right encouragements or inducements for whistle-blowers might be problematic and certainly will require long term, concerted effort. Organization members apparently have been well socialized to believe that organizational dissidence is undesirable: to convince them otherwise—that authority structures will easily permit, indeed support, organizational dissidence—will be a complex process.

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Effect of Occupation on Task Related, Contextual, and Job Involvement Orientation: A Cross-Cultural Perspective

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A cross-cultural study analyzes the effects of occupational membership on the task related, contextual, and job involvement orientation of 5,550 employees, selected from 20 countries. The empirical relationships among these variables are calculated via regression and discriminant analysis. Results indicate a strong effect of occupation on work orientation, even after controlling for cultural attributes such as language and ethnicity.

A significant body of literature has been accumulating on the relationship between cultural attributes and the resulting work orientation of different cultural groups. Most of this research operates from the implicit assumption that cultural characteristics, norms, and values determine the expressive and instrumental meaning of work (England, 1979). Some of the most commonly used cultural attributes include the history of a given society (Haire, Ghiselli, & Porter, 1966; Malinowski, 1960); language (Hoebel, Frost, & Spencer, 1976; Whorf, 1956); religion (Terpstra, 1978; Weber, 1958); political system (Blake & Walters, 1976; Huntington, 1973); ethnicity (Katona, Strumpel, & Zahn, 1971; Myrdal, 1968); general economic level (Greenwood, 1974; Harbison & Myers, 1960); and geographical propinquity (Haire et al., 1966; Schaupp, 1979).

Unfortunately, there has been little cross-cultural work on the influence of common occupational experiences on work orientation. This is surprising in view of the large amount of theoretical and empirical research in the United States postulating a high correlation between type of occupation and the importance assigned by incumbents to different work aspects (Blair, 1964; Centers & Bugental, 1966; Cummings & Elsalmi, 1968; Friedlander, 1965; Gomez-Mejia, 1983; Mortimer & Lorence, 1979). The present paper presents an empirical study to close this research gap. The relationship between occupational membership and the importance attached to different

work aspects will be measured on a sample of 5,550 employees, selected from 20 countries, working for a large multinational corporation. The work orientation measures include three sets of scales—task related, contextual, and job involvement—previously validated in all 20 countries (Gomez-Mejia, 1983). The empirical relationship between the independent and dependent variables will be calculated via regression and discriminant analysis while controlling for cultural attributes such as language and ethnicity.

Conceptual Overview

The "classical" model commonly used to explicate the observed relationship between occupation and work orientation relies on the concept of need (Alderfer, 1977; Maslow, 1963; McClelland, 1961). This view asserts that people have needs, jobs have characteristics and provide certain rewards, and the importance assigned to different work aspects results from their conjunction. These need satisfaction models emphasize individual dispositional explanations for work orientations based on the need deficiency-activation formulation rather than socialization factors.

The need models have been criticized in recent years for oversimplifying reality (Shaw, 1980; Weiss & Shaw, 1979). Besides the philosophical controversy of specifying a number of needs and their interrelationship, the need models do not adequately consider the influence of the social context in affecting individuals' perceptions via an attribution process (e.g., Salancik & Pfeffer, 1978), nor do they take into account the reinforcing effect of occupational experience in molding/changing work orientations over time (e.g., Mortimer & Lorence, 1979).

A more recent formulation used to explain observed differences in work orientation by occupational groups is the social processing of information model, which focuses on the socializing effect of an individual's occupation or type of work (Salancik & Pfeffer, 1978; Shaw, 1980; Weiss & Shaw, 1979). The social information perspective approach proceeds from the fundamental premise that individuals, as adaptive organisms, conform their attitudes and beliefs to their social context. An important source of information is the person's work environment. The work environments that characterize various occupations are likely to shape attitudes and values because they: (a) provide cues that individuals use to construct and interpret events; (b) provide information about what a person's attitudes and opinions should be; (c) provide direct construction of meaning through guides to socially acceptable beliefs, attitudes, and acceptable reasons for actions; and (d) allow individuals to use their own day-to-day behavior to "enact" or construct reality by cognitively evaluating the dimensions of their jobs or task environment. Under this view an employee's occupation is a significant determinant of the individually expressed views about the strength of preferences for various work aspects, or what is judged to be good, proper, desirable, and worthwhile in the work environment and the nature of work.

It should be noted that the "social processing" position does not per se contradict the need-deficiency hypothesis, nor should it be seen as a substitute of the need models. The need models are not really concerned with the importance assigned to all work aspects, but rather with those aspects that are directly related to the level of satisfaction or dissatisfaction with basic, universal needs, such as maintenance and relatedness. In a sense, the need models can make specific predictions pertaining to specific dimensions (e.g., intrinsic factors), given the level of satisfaction/dissatisfaction with some underlying needs (e.g., physiological needs). The social context model is more generic and shows less directionality in its prediction/explanation of work orientations. The central postulate is that individuals in a given occupation, job, or work group would share more values in common than would those in different occupations, jobs, or work groups because of the degree of similarity/dissimilarity in the social settings.

Hypothesis

In view of the number of studies documenting the relationship between occupational level and work orientation in the United States, and the influence of occupational membership on perceived task characteristics, it is surprising that most researchers who have studied work orientations cross-culturally have ignored occupation as an explanatory variable for the differences found or have (more frequently) failed to control for this variable in their sampling.

This study postulates that the importance attached by employees to various work aspects is universally contingent on occupational membership. Members of an occupational group would share similar work orientations because incumbents would perform similar tasks and would share a similar social context (Salancik & Pfeffer, 1978; Shaw, 1980; Weiss & Shaw, 1979). As a result, *one would expect greater commonality among individuals in the same occupation across different cultures than among individuals in different occupations within the same culture.* In testing this hypothesis, it is implicit that cultural factors (e.g., language) are "controlled for." That is, cultural attributes are likely to be related to the same variables in a functional manner; therefore, cultural characteristics must be taken into account in order to isolate the distinctive contribution of occupation in explaining the importance assigned by employees to different work aspects across different countries.

Method

Sample

A sample of 10,000 employees (all natives and living in their country of origin), chosen via a stratified random sample approach from a large multinational organization, was selected for this study from 20 different countries

in 5 continents. Of these, 56 percent ($N=5,550$) completed and returned the paper-and-pencil survey during 1978-1979. All respondents were full time employees of this multinational corporation. Employees who were foreign assignees and those who were not citizens of the country in which they were employed comprised less than 2 percent of each country's sample and were excluded from the study. The country samples included representatives from nine major occupational groups, ranging from factory workers to managers. A breakdown of the sample according to country, occupation, and other demographic characteristics appears in Exhibit 1.

Because all respondents came from one organization, technology and management structure were relatively constant from country organization to country organization. Moreover, most individuals were subject to the same corporate policies and practices. The multinational business corporation studied employs people located in many subsidiary locations around the world. These subsidiaries have comparable organizational structures, use a similar technology, and market the same type of products and services; yet they remain under strong local management control and are regulated by the laws and policies of the nation in which they are located. The organizational setting, therefore, provides a unique opportunity to collect data on a controlled and systematic basis from a well-defined work environment and employee population.

Use of a multinational employee sample actually helps to control for confounding variables in cross-cultural research, but it has a disadvantage in that it is difficult to determine to what extent the organizational work force is representative of the entire society. On the other hand, a close correspondence between sample parameters and the entire society, though ideal, is extremely difficult and costly to achieve (England, 1979). As argued by Greenwood (1974), Griffeth, Hom, DeNisi, & Kirchner (1980), Schaubp (1979), and Sirota and Greenwood (1971), the advantages of using one organization in cross-cultural management research (i.e., control and systematicity in organizational settings) may actually outweigh its disadvantages (potential pitfall that the findings may have limited generalizability).

Measures of Work Orientation

The survey tool consists of 14 items measuring the importance assigned by workers to a variety of work-related aspects. The survey was developed over a 10-year period and was continuously refined (over successive administrations to thousands of employees in the United States) by a full time professional staff in a large corporation (Gomez-Mejia, 1983). The *task related* scale measures the importance assigned by workers to such intrinsic factors as responsibility, autonomy, ability utilization, accomplishment, and challenge. The *contextual* scale, on the other hand, measures such extrinsic aspects as working conditions, company policy, company reputation, human relations, personal attention, compensation, and job security. The *job involvement* scale measures the extent to which work is an important part

Exhibit 1 **Research Sample Composition** **(N = 5,550)**

<i>Country</i>	<i>N</i>	<i>Education</i>	<i>N</i>
1. Australia	490	Some high school	616
2. Austria	63	High school graduate	1,396
3. Belgium	29	Some college or trade school	2,124
4. Brazil	118	College graduate	746
5. Denmark	58	Graduate/professional school	604
6. France	161	Unknown	64
7. Germany	64		
8. Greece	62	<i>Sex</i>	
9. Israel	91	Male	2,981
10. Korea	1,063	Female	2,134
11. Netherlands	117	Unknown	435
12. New Zealand	39		
13. Norway	30	<i>Age</i>	
14. Portugal	99	Less than 25 years	1,353
15. South Africa	118	25-29 years	1,121
16. Sweden	48	30-39 years	1,971
17. Switzerland	62	40-49 years	751
18. Taiwan	71	50-59 years	254
19. United Kingdom	422	More than 59 years	34
20. United States	2,343	Unknown	66
Unknown	2		
<i>Occupation</i>		<i>Years in Present Occupation</i>	
Clerical/office	761	Less than 1 year	368
Production	1,692	1-2 years	1,022
Technical	343	3-5 years	1,304
Field technician	587	6-10 years	1,376
Administrative	396	11 or more years	1,385
Programmer/Analyst	572	Unknown	5
Engineer	312		
Management	575	<i>Language</i>	
Sales/marketing	273	Swedish	49
Unknown	39	Norwegian	29
		German/Danish	379
		French	207
		Italian	28
<i>Ethnic Origin</i>		English	3,364
Black	120	Portuguese	217
Scandinavian	415	Greek	62
British	1,714	Hebrew	81
Germanic	558	Chinese	71
Central European	199	Korean	1,063
Latin	337		
Oriental	1,193	<i>Historical Background</i>	
Jewish	210	Cluster 1	136
Greek	96	Cluster 2	426
Unknown	708	Cluster 3	3,294
		Cluster 4	190
<i>Geographical Area</i>		Cluster 5	217
Northern Europe	865	Cluster 6	1,134
Central Europe	289	Cluster 7	153
Southern Europe	62		
Far East	1,134	<i>Religion</i>	
Middle East	91	Lutheran	251
South America	118	Anglican	169
Pacific	529	Presbyterian	218
Africa	119	Other Protestants	756
North America	2,343	Catholic	2,381
		Greek Orthodox	160
<i>Political System</i>		Jewish	281
Constitutional monarchy	587	Confucian	827
Federal republic	3,612	Buddhist	307
Military rule/civilian dictatorship	1,351	Unknown	200

of the employee's life. For each work aspect, employees were asked to indicate how important it is to them, using the following response format: "On my ideal job, how important is it...": (1) "Not important"; (2) "Somewhat important"; (3) "Important"; (4) "Very important"; (5) "Extremely important."

The entire instrument was translated from English into other national languages by a team of professional translators, and then back-translated into English by another team of professional translators (Gomez-Mejia, 1983). This process helped ensure the cross-linguistic validity of the instrument. The scales were cross-validated in each of the country samples. The results of this analysis indicated that (a) different psychometric procedures (internal consistency analysis, factor analysis, and convergent validity) all supported the pan-cultural validity of these measures and (b) these three scales could be used as separate dependent variables across the 20 country samples. (The statistical results of the validation phase cannot be presented here because of space limitations. A validation report may be obtained by contacting the author.)

The task related measure correlates .25 with the contextual scale and .45 with job involvement. In turn, job involvement correlates .34 with the contextual variable.

Measures of Occupational Membership

On the questionnaire, each individual was assigned an occupation code. All subsidiaries use a standard classification system to assign occupation codes. This permits world-wide uniformity in job descriptions so that, for instance, the job qualifications, duties, and responsibilities of a production worker in Korea closely correspond to those of other production workers throughout the corporation. The resulting sample distribution by occupational groupings can be found in Exhibit 1.

Measures of Cultural Variables

Based on a review of the cross-cultural literature, several variables were selected to "control" for cultural attributes. Individual cultural characteristics for the entire sample, (i.e., religion, ethnic origin, and language) can be found in Exhibit 1. The remaining "macro" cultural variables were codified using the following classification scheme:

Geographical Area. A code was assigned to each individual case using a standard geographical classification (Haire et al., 1966), as shown in Exhibit 1.

Political System. There is no single standard by which to classify the political system of individual countries. However, there seems to be general agreement that political systems can be broken down into a broad taxonomy based on the type of government structure (Holesovsky, 1978), as indicated

in Exhibit 1. Using this trichotomy, each case was assigned a score based on the type of government structure in his/her home country.

Shared Historical Background of Society. The 20 samples were subdivided into 7 clusters, each of which is composed of countries with a very strong historical interaction. For each of these clusters, the countries are either descendants of the same national entity or have a long history of mutual relationships (e.g., political domination, alliances). These seven clusters include:

- 1: Sweden, Norway, Denmark
- 2: Germany, Austria, Switzerland, Netherlands, South Africa
- 3: United Kingdom, Australia, New Zealand, U.S.A.
- 4: France, Belgium
- 5: Portugal, Brazil
- 6: Korea, Taiwan
- 7: Includes remaining two countries (Greece and Israel) that could not be meaningfully classified into any of the previous clusters.

Given his/her country sample, each employee was assigned a corresponding cluster code.

Level of Economic Development. This variable was measured by the per capita gross national product of each nation.

Analysis

The linkages between occupational membership and the work importance scales, while controlling for the cultural attributes, were measured via multiple regression and discriminant analysis.

Regression Methods. Separate regression equations were used to analyze the relationship between each dependent variable (task related, contextual and job involvement scales), with occupational and cultural attributes. First, all predictor variables were regressed without a predetermined order, whereby variables were included sequentially into the equation based on the respective contribution of each predictor to explained variance in the dependent variable. This standard regression procedure does not assume a definite causal ordering among the variables, and therefore would empirically identify the most powerful predictors of work orientation. Second, a stepwise regression was calculated whereby the cultural variables were entered first, and occupational membership was included in the last step. This regression was used to show the unique marginal contribution of occupation to work orientation in terms of ΔR^2 , after the cultural control variables had previously been included into the equation.

Third, separate regression equations were calculated between cultural variables and each of the dependent variables by occupational group. These analyses were used to determine the extent to which the potency of cultural factors may vary by type of occupation. For example, cultural characteristics may be more powerful predictors for managerial jobs (which are less constrained by technology than production jobs). Alternatively, because American management training and philosophy might dominate this corporation's

policies/practices, one may find that culture would be less important at that level.

There are two alternative methods for coping with the problem of assigning numerical values to categorical variables, dummy coding, and the use of reciprocal averages (Dawis & Weiss, 1968; Weiss, 1963). To check for any potential bias of the reciprocal averages procedure versus the dummy coding method, three cultural variables (ethnic, religion, and language) were scored, in turn, by both of these methods. Separate regression equations then were computed for these variables against the task related scale. This analysis indicated that both scoring methods led to essentially identical results. The R^2 for the dummy coding method was .079 ($R = .281$) versus $R^2 = .073$ ($R = .271$) for the reciprocal averages method. The orderings of the three cultural variables in terms of ΔR^2 were identical for the two methods; the only differences found in ΔR^2 were at the third digit after the decimal point. No differences were found for the level of statistical significance.

Although the use of dummy coding would be appropriate for scaling categorical variables in a regression equation when the number of variables/categories is small, it is not a viable procedure when dealing with a large number of variables/categories such as in this project (Dawis & Weiss, 1968; McCann & Gomez-Mejia, 1982; Weiss, 1963). Problems in interpretation, computation, and reliability would render this procedure inappropriate for present purposes. Because of these problems, reciprocal average scaling was utilized in this project. This procedure scales each interval of each predictor according to the magnitude of the mean score on the criterion for those individuals whose predictor scores fall in that interval of each predictor (Dawis & Weiss, 1968; Hoyt & Collier, 1953; Mitzel & Hoyt, 1954).

Multiple Discriminant Analysis. Discriminant analysis was used to classify each individual by categorical variable, given the task related, contextual, and job involvement scores. A separate discriminant analysis procedure using the direct method (Statistical Package for the Social Sciences, 1977) was conducted for each nominal variable. The classification accuracy of this method is assessed by the "hit rates" or the percent correspondence between actual and estimated group membership for each variable. Because individuals would be classified into an estimated group membership for each categorical variable, there was no need to develop a numerical scale for each of these variables. Therefore, in addition to the classification information offered by discriminant analysis, this method provided a built-in double-check on the reliability of the regression procedure.

Results

Each of the standard regression equations (i.e., when predictors are not entered in a predetermined order) against the task related, contextual, and job involvement scales appears in Table 1. The separate standard regression equations for each set of variables (cultural, occupational, and mixed) are summarized in Table 2. The marginal ΔR^2 when occupational membership

Table 1
Variables Contributing to Standard Regression on Task Related,
Contextual, and Job Involvement Scales^a
(N= 5,550)

<i>Variables</i>	<i>R</i>	<i>R²</i>	<i>ΔR²</i>	<i>Simple γ</i>
<i>Task Related Scale</i>				
Occupation	.369	.136	.136	.369
Geographical area	.386	.149	.013	.263
Ethnic origin	.393	.155	.012	.232
GNP	.396	.157	.002	.231
Language	.397	.158	.001	.246
Historical background	.399	.159	.001	.246
Religion	.399	.159	.000	.246
Government	.400	.160	.001	.247
<i>Contextual Scale</i>				
Occupation	.361	.130	.130	.361
Language	.399	.159	.029	.278
Religion	.421	.177	.018	.291
GNP	.422	.178	.001	.271
Ethnic origin	.422	.178	.000	.235
Geographical area	.423	.179	.001	.238
Government	.423	.179	.000	.212
Historical background	.423	.179	.000	.234
<i>Job Involvement Scale</i>				
Occupation	.377	.142	.142	.377
GNP	.387	.150	.008	.207
Historical background	.391	.153	.003	.230
Language	.392	.154	.001	.217
Government	.394	.155	.001	.179
Religion	.394	.155	.000	.198
Ethnic origin	.395	.156	.001	.114
Geographical area	.395	.156	.000	.128

^aAll regression coefficients and simple correlations are significant at $p \leq .05$. The order of inclusion in each equation is determined by the respective contribution of each variable to explained variance.

is entered last using stepwise regression also is shown in the lower half of Table 2.

By examining these tables, it becomes evident that occupational membership is an important determinant of all three work orientation scales. As can be seen in Table 2, the occupational membership equation accounts for much more variance than the cultural equation (13.6 percent vs. 7.8 percent on the average). The standard mixed equations in Table 1, which include all variables without a predetermined order of entry, indicate that occupation is the single most important predictor of work orientation. This is not surprising: occupation exhibits the highest bivariate correlations with all three dependent measures. When the stepwise regression mode is used, so that cultural variables are entered first, the ΔR^2 obtained by including occupation in the last step results in approximately a doubling of the variance being explained by cultural factors alone (see lower half of Table 2).

Table 2 also summarizes the results of discriminant analysis by extracting the "hit rates" for each categorical variable from the diagonal of the classification matrices. (The separate matrices are not included here because of space limitations.) The actual (observed) hit rates are compared to the

Table 2
Summary Table of Regression and Discriminant Analysis for
Cultural, and Occupational Variables^a
(N=5,550)

Equations	Regression Results for Work Orientation Scales						Discriminant Results ^b Average % Improvement over Random Hit Rates
	Task Related		Contextual		Job Involvement		
	R	R ²	R	R ²	R	R ²	
Cultural variables only	.271	.073	.312	.097	.251	.063	209.70
Occupational variable only	.369	.136	.361	.130	.377	.142	264.44
Cultural and occupational variables combined	.400	.159	.423	.179	.395	.156	238.07
Contribution of occupation to step- wise regression (cultural variables entered first)	$\Delta R^2 = .086$		$\Delta R^2 = .082$		$\Delta R^2 = .093$		

^aAll regression coefficients and discriminant functions are significant at $p \leq .0001$. Separate regression equations are not included because of space limitations.

^bScores were obtained by dividing the actual hit rates over the expected (random) hit rates across all classifications of the corresponding categorical variables. GNP was excluded because this is a continuous variable.

expected (random) hit rates, so that the percent improvement over chance (PIOC) can be assessed for each categorical variable (Gomez-Mejia, 1983). The discriminant results in Table 2 strongly corroborate the findings of the regression method. Occupational membership shows a higher PIOC than the cultural control variables, either singly or as an average across all variables.

Table 3 shows the regression coefficients for the cultural equations when these were calculated within each occupational sample. The explained

Table 3
Regression Analysis of Cultural Variables by Occupational Group

Cultural Equations by Occupational Level	Regression Results for Work Orientation Scales					
	Task Related		Contextual		Job Involvement	
	R	R ²	R	R ²	R	R ²
Managers and administrators (N=971)	.256	.066	.268	.072	.221	.049
Professionals and technicians (N=2,087)	.227	.052	.281	.079	.219	.048
Clerical/office workers (N=761)	.278	.077	.297	.088	.263	.069
Production/factory workers (N=1,692)	.328	.107	.379	.143	.309	.095
Contribution of interaction effect of culture/occupa- tion to stepwise regression (culture and occupa- tion entered first) (N=5,550)	$\Delta R^2 = .014$		$\Delta R^2 = .031$		$\Delta R^2 = .021$	

1. The separate regression equations against the work orientation scales were computed by occupational sample with the seven cultural characteristics as independent variables (upper portion of table). The ΔR^2 due to the interaction effect of culture/occupation (lower half of the table) was calculated on the entire sample for each dependent variable by regressing culture, occupation, and their cross-product terms, in that order. The cultural measure used in this last equation was created by averaging each individual's scores across the seven cultural attributes.
2. All regression coefficients were significant at $p \leq .001$.

variance attributed to cultural characteristics tends to be greater at the lower end of the occupational spectrum, namely for clerical/office workers and production/factory workers. On the average, the R^2 for these groups is .035 higher than the R^2 for managers/administrators and professionals/technicians. The ΔR^2 attributed to the interaction effect of culture and occupation for the entire sample averaged .022 across the three dependent variables.

Discussion and Conclusions

A critic may argue that the findings reported here simply reflect certain aspects of culture. Apart from this argument in semantics, in which culture may be defined as an all-encompassing construct, the important message of this paper is that occupational characteristics are uniformly predictive of work orientation. Whether those occupational characteristics are labeled "socioeconomic" or "cultural" in no way reduces the value of identifying the relevant variables explicating the importance assigned by workers to

Table 4
Mean Distribution of Work Orientation Scales by
Occupational Level for Selected Country Samples^a

Country	Scale	Managers and Administrators	Professionals and Technicians	Clerical/Office Workers	Production/Factory Workers
Australia	TR	4.5	4.3	3.7	3.4
	CT	3.9	3.8	4.1	4.0
	JI	4.4	4.2	3.6	3.2
Brazil	TR	4.6	4.2	3.9	3.6
	CT	3.5	3.6	4.1	4.3
	JI	4.4	4.2	3.7	3.1
France	TR	4.3	4.1	3.4	3.3
	CT	3.7	3.9	4.1	4.2
	JI	4.6	4.1	3.9	3.7
Israel	TR	4.7	4.4	4.0	3.8
	CT	4.1	4.3	4.4	4.5
	JI	4.6	4.1	3.8	3.4
Korea	TR	4.3	4.1	3.3	3.1
	CT	3.7	3.6	4.2	4.3
	JI	4.6	4.4	3.7	3.5
Netherlands	TR	4.1	4.3	3.8	3.9
	CT	3.9	3.8	4.2	4.4
	JI	4.4	4.2	3.7	3.6
Portugal	TR	4.7	4.3	3.9	3.2
	CT	4.1	4.0	4.3	4.5
	JI	4.6	4.4	3.8	3.4
South Africa	TR	4.2	4.4	3.6	3.8
	CT	3.6	3.9	4.2	4.4
	JI	4.5	4.4	3.8	3.4
Great Britain	TR	4.4	4.0	3.5	3.4
	CT	3.6	3.4	4.1	4.3
	JI	4.5	4.7	3.8	3.5
United States	TR	4.3	4.1	3.9	3.7
	CT	3.8	4.0	4.1	4.3
	JI	4.2	4.0	3.7	3.5

^aThe 10 countries with the largest sample sizes are included in this table. Each occupational cohort includes 30 or more cases for each country. The task related (TR), contextual (CT), and job involvement (JI) scores reported in the matrix consist of the average scale values for each of the corresponding samples.

different work aspects. As can be seen in Table 4, the pattern of mean scores by occupational level is remarkably similar across diverse country samples, and is quite consistent with that found in conventional studies of U.S. workers (Centers & Bugental, 1966; Friedlander, 1965). Overall, the task related and job involvement orientation of workers increases as a function of occupational level; a contextual orientation tends to be more pronounced at the lower end of the occupational spectrum.

This study also suggests that cultural factors tend to be less predictive of the work orientation of managers than of rank-and-file workers. Several factors may contribute to this. American management training, philosophy, and policy are more likely to have a direct and unifying effect at that level. Local workers assigned to managerial positions also are likely to be carefully screened to fit into the company model. Lastly, managerial and professional staff are more educated, and occupational norms tend to be more salient at that level (Mortimer & Lorence, 1979). Whatever the reasons for these findings, the data suggest that culture may have a differential impact by occupational level.

Many of the cross-cultural differences in work orientations described in the literature may be artifactual, the differences attributable to variations in the occupational distribution among the research samples rather than to any inherent cultural characteristics. Perhaps many of the differences attributed to a cultural effect may have disappeared if samples with similar occupational characteristics had been carefully matched and compared cross-culturally.

Given the widespread use of importance ratings in attitude surveys, both by domestic and multinational companies, this study indicates that appropriate interpretation of this data requires that occupational norms be available when making international comparisons. For example, the author once encountered a senior vice president of a large corporation arguing that employees in the Korean plant favored job security over rapid promotions because of their Confucian background. A computer program developed as part of this research quickly showed that workers in the Korean operation were very similar in their work orientation to European and American employees working in production facilities (94 percent of Korean employees were production personnel). Obviously, inappropriate interpretations of survey data can lead to faulty policies based on erroneous (and often stereotypical) assumptions.

The findings reported here may be used to generate and test additional hypotheses regarding the impact of occupational membership on work orientations. The international data used in this study were cross-sectional in nature. Therefore, even when the data attest to the impact of occupational experience on work orientations, it is not possible to isolate the relative effect of the occupational experience from the self-selection factor on the dependent variables. The occupational experience hypothesis would argue that occupations "mold" the work orientation of individuals. The self-selection hypothesis, on the other hand, would argue that persons choose their work on the basis of already formed psychological characteristics. To the extent

that work orientations are formed relatively early in life, before the completion of formal education and before entering the labor market, they may persist throughout the work history of an individual. Although the occupational experience hypothesis has been confirmed in two large scale longitudinal studies in the United States (Kohn & Schooler, 1973; Mortimer & Lorence, 1979), such a hypothesis has not been tested on an international sample. Unfortunately, the limitations of the data used in this research do not allow one to measure both the occupational and self-selection effect on work orientations. To be able to separate these two effects necessitates the use of a longitudinal study that measures work orientation changes over time. Such a study would require that: (a) work orientations are measured early in life; (b) these attitudes then are related to occupational selection; and (c) work orientations are monitored over time to observe how experiences encountered at work influence the importance assigned to the same work aspects. In spite of the difficulty and the costs of obtaining such data, only an international longitudinal study can elucidate in unambiguous terms the processes through which childhood socialization, work experiences, and work orientations are interrelated over time.

In cross-cultural research, extraneous variables often cannot be adequately controlled. In this study, the groups were all considered to be comparable across national boundaries because they all were selected from the same international organization, with a similar technology, and comparable job titles and functions within the organization. The standardization, translation, and sampling procedures used permitted an investigation beyond the traditional two-country or "convenience sample" comparisons typically reported by most cross-cultural research in this area. All employees surveyed were natives of each country and with the exception of managerial and professional personnel, they were not likely to have traveled extensively, be deeply influenced by corporate policy, or be directly socialized by "foreign" values. In other words, a multinational organization permits better control for organization, technological, and general environmental conditions. At the same time, the use of one organization has some disadvantages in interpreting results. Perhaps the resulting data patterns are partly a function of the relatively homogeneous organizational conditions and may not be representative of the workers from each of the selected cohorts. The question of uniqueness or "organization specific findings" can be answered only by further replicating this study in other organizations across the various countries.

Although this paper isolated several cultural attributes that have been suggested as relevant in their effect on work orientations, no attempt has been made to develop an integrated cultural model. Rather, these variables (e.g., language) have been used as control variables to reduce the likelihood that the coefficients of the occupation variable are biased because of omitted variables. As a whole, most of the existing cross-cultural management literature has emphasized culture as an independent variable in explaining work values. However, the literature tends to be inductive and descriptive, and cultural characteristics are very loosely specified. Although the cultural

measures used in this research showed a rather modest effect on work orientations, it does not follow that the concept of culture should be ignored as an important independent variable in its own right. Rather, the author feels that investigators in this area should devote more attention to developing a coherent cultural model of work orientations that (a) delineates major cultural attributes affecting work orientations, (b) explains why these attributes are likely to affect work orientations, (c) isolates specific cultural variables to operationalize the construct of culture (e.g., language), and (d) allows one to make predictions and generalizations pertaining to specific cultural attributes and how they are linked to particular work orientations in combination with occupational characteristics.

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Collective Climate: Agreement as a Basis for Defining Aggregate Climates in Organizations¹

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Agreement of psychological climate perceptions is proposed as a basis for a composition theory of aggregate climate. Climates based on agreement, termed "collective climates," are shown to meet several requirements for construct validity including internal consistency, discrimination, and predictable relationship to relevant criteria. Personal and setting characteristics related to membership in collective climates are determined.

Researchers have come to partial agreement concerning the meaning of organizational climate. At the individual level, climate has been defined as a summary perception of the organization's work environment that is descriptive rather than evaluative in nature (Gavin & Howe, 1975; James & Jones, 1974; Joyce & Slocum, 1979, 1982; Payne, Fineman, & Wall, 1978; Schneider, 1975; Woodman & King, 1978). There is less agreement concerning whether these individual perceptions may be aggregated to represent the climate of a group or larger unit of analysis. Studies of aggregate climates have examined climates based on membership in formal organizational units (Drexler, 1977; Gavin, 1975; Gavin & Kelley, 1978; Howe, 1977; Jones & James, 1979; Newman, 1975), hierarchical position (Schneider & Snyder, 1975), and demographics (Schneider, 1975). No basis for aggregation has been consistently supported (James, 1982; Schneider & Reichers, 1983). Further research is necessary because of the presumed relationships between aggregate climates and organizational, subunit, and individual performance (Field & Abelson, 1982; Jones & James, 1979).

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The purpose of this study was to research the validity of aggregate climates based on agreement of individuals' psychological climate scores. James has convincingly argued that although the relevant unit of analysis for a theory of climate is the individual, "aggregate climate perceptions may provide a powerful explanatory and predictive tool" (1982, p. 221). The usefulness of an aggregate climate concept is that it allows the description of organizational settings in psychological terms, yielding "an understanding of how individuals in general impute meaning to environments, and especially, how individuals will respond to environments" (1982, p. 220). Obtaining these benefits requires that agreement among individuals' climate perceptions be demonstrated *prior* to aggregation to a macro level of analysis (James, 1982; Roberts, Hulin, & Rousseau, 1978). Climates based on perceptual agreement will be termed *collective* climates here to make clear that they refer to aggregate climates that do not necessarily overlap formal organizational units, divisions, or work groups.

Review of Aggregate Climate Research

A considerable amount of research has addressed the validity of various types of aggregate climates. A number of methodological criteria have been employed including: (1) discrimination, or demonstrable differences between mean perceptions between climates (Drexler, 1977; Howe, 1977; Newman, 1975); (2) predictable relationships to organizational or individual criteria (Pritchard & Karasick, 1973); and (3) internal consistency, or agreement in perceptions within aggregate climates (Howe, 1977). It is important to note that this third criterion has not been used as a *basis* for pooling psychological climate scores to form a measure of aggregate climate. Aggregate climates have been formed on other bases, such as work group membership, and only then were examined to see if these climates were internally consistent. As long as climates are based upon such a priori groupings, the question of the reliability of the climates must be addressed prior to any speculation concerning relationships between climate and various criteria. Jones and James note that methodological limitations suggest that judgments concerning the validity of a particular aggregate climate concept "should rest on more than one" of the criteria (1979, p. 208). Logically, all three must be satisfied to provide consistent indication of construct validity. Representative studies of aggregate climates therefore may be conveniently grouped into those using one, two, or all three of the above criteria.

When only one criterion has been used, it often has been discrimination. Drexler (1977) utilized a composite climate measured from the *Survey of Organizations* (Taylor & Bowens, 1972) to study discrimination in climate perceptions among 21 organizations and 1,256 groups. Drexler found significant differences among the 21 organizational climates, as well as among subunit climates based on membership in functional specialties. Drexler's study supported the validity of *organization* climate with respect to criteria

for discrimination. It is possible, however, that Drexler's results are overstated as a result of aggregation bias (James, 1982).

Most studies of aggregate climates have used two criteria in assessing validity, but these criteria have varied. A range of such studies is represented by work done by Pritchard and Karasick (1973) and Howe (1977). Pritchard and Karasick utilized criteria of discrimination and relationship to performance in a study of a national franchising chain. They aggregated individuals' climate scores by sales region, and then correlated these scores with measures of the region's economic performance. Aggregate climate scores also were contrasted for two organizations determined to have different climates by an independent team of psychologists. Results supported the use of aggregate climates based on *sales region*.

Howe (1977) researched work group climates by examining the independent contributions of subject and group effects to explained variance in climate perceptions. Using a randomized block analysis of variance design, he directly assessed the construct validity of group climate in terms of both internal consistency and discrimination. He examined 16 dimensions of climate. Significant subject effects were found for most dimensions, indicating little consensus concerning climate perceptions within groups. Significant group effects were found for only 5 of the 16 dimensions. The proportion of variance explained by groups never exceeded 13 percent. These results do not support use of the formal *work group* as a basis for aggregating individual climate scores. Unfortunately, Howe might have confounded within-group agreement stability over time to obtain an error term for significance tests.

Jones and James (1979) report one of the few studies using all three of the above criteria. They computed mean climate scores within divisions performing a variety of tasks aboard 20 U.S. Navy ships operating in the North Atlantic and Pacific. A total of 233 divisions were studied. Their results indicated that aggregate climates based on *divisions* met all three criteria for aggregation previously discussed; those based on ship and/department (propulsion, boiler, electrical, etc.) did not. Patterns of climate dimensions among divisions were systematically and predictably related to satisfaction and performance.

Some general remarks may be made about these representative studies. First, some researchers have relied on only one of the three criteria described above. Others have utilized some combination of two of the three. In either case, the resulting evidence concerning the validity of an aggregate climate concept must be inconclusive. If each criterion is important, then logically all three must obtain to provide consistent evidence of validity.

Second, most researchers have relied on some form of discrimination test. This generally has produced positive results. Fewer studies have shown validity with respect to two or more criteria in combination. Only Jones and James (1979) have shown validity with respect to all three. These disappointing and inconclusive results may be attributed to the hypothesis testing approach being used to research aggregate climates. Hypothesis testing approaches

postulate homogeneity of psychological climate perceptions for various social aggregates, and then test for differences in mean climate perceptions among these groups. The success of this method depends on the researcher's ability to hypothesize *a priori* units of the organization within which agreement of climate perceptions are likely. The researcher then still must empirically demonstrate this agreement to provide evidence justifying aggregation (James, 1982). Furthermore, such an approach jeopardizes the possibilities of finding predictable relationships to external criteria. If the hypothesized climates are not internally consistent when such scores are "averaged within a work group and then correlated across work groups, a high correlation cannot be established because the averages have little or no reliability" (Schneider, 1975, p. 468).

Aggregate climates also could be researched as a problem in numerical taxonomic methods. Unlike hypothesis testing approaches, numerical taxonomic methods first would search for similarities in climate perceptions, and then examine discrimination and relationship criteria. Climates would be based on agreement in perceptions. This would maximize the probability that climates meet criteria of discrimination. As similarity within climates is maximized, similarity among them is minimized. By using agreement rather than some other hypothesized basis for aggregation, one obtains climates that automatically meet criteria of consistency and discrimination. The efficiency and statistical advantages of this procedure are well documented in the literature on numerical taxonomy (Anderberg, 1973). If these climates can be shown to affect important organizational criteria, and their origin can be discovered in individual and organizational factors, preliminary evidence of the usefulness of aggregate climates based on agreement will have been provided.

Aggregate climates based on agreement of psychological climate perceptions are labeled collective climates, a term intended to indicate that these climates do not place any restrictions on the concept beyond the three criteria for aggregation previously discussed. The rule for collecting is agreement on psychological climate perceptions. No other restrictions are required. Because any valid aggregate climate must meet the minimum criteria of internal consistency, discrimination, and relationship to relevant work outcomes, collective climate is the least constrained concept of aggregate climate possible. It does not assume a particular basis for aggregation, such as work groups, regions, or divisions.

Defining aggregate climate on the basis of agreement has a number of theoretical as well as methodological advantages. Collective climates identify individuals for whom the situation has common stimulus value (Pearlman, 1980). This is not necessarily accomplished by *a priori* groupings based on formal organizational groups. These groupings neglect the possibility that individuals within the same group perceive the work situation differently because of differences in the nature of their specific jobs, differences in leader-subordinate dyadic interactions, and other factors, such as position in the group (deviant, isolate, etc.). This is important because one would

expect individuals who perceive their work environment similarly to behave similarly. Stern, Stein, and Bloom propose that agreement in climate perceptions is important "insofar as attempts to identify individuals who will exhibit similar qualities of performance is simplified by considering subjects for whom the press [situation] has similar stimulus value" (1956, p. 37).

The theoretical importance of agreement for studying aggregate climate has been supported by every major review of the climate literature. James and Jones concluded that there "appear to be other types of situational influences which might be appropriately considered organizational climate and which go beyond known situational characteristics. One example. . . is the role of consensus of perceptions of the environment" (1974, p. 1109). Hellriegel and Slocum suggested that a parsimonious way of assessing aggregate climate would be to "determine the degree of congruence between climate perceptions" (1974, p. 276). Payne, Fineman, and Wall argue that "many studies of organizational climate lack validity since they do not show an adequate consensus by which measures could be said to validly describe organizations" (1976, p. 49). Finally, Schneider writes that the "problem of inter-rater agreement on climate perceptions must be addressed" (1975, p. 468).

This research studies aggregate climates defined by agreement in psychological climate perceptions. The concept of collective climates and the statistical techniques utilized to identify them maximize the probability that criteria of internal consistency and discrimination will be met. The specific criteria studied in this research are job performance and satisfaction. These criteria were chosen because of their general importance as work outcomes. Because of the exploratory nature of the collective climates concept, specific relationships among collective climates, job performance, and facets of job satisfaction are not hypothesized. These relationships are the subject of additional analyses. The general propositions are:

P1: Membership in climates formed on the basis of similarities in perceptions (collective climates) will be significantly related to measures of individuals' job performances.

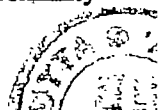
P2: Membership in collective climates will be significantly related to individuals' job satisfactions.

Underlying these propositions is the idea that collective climate may reflect common patterns of assigning psychological meaning to an environment. Collective climates may reflect similarities in cognitive disposition, structuring redefinition or selective attention, as well as similar situational stimuli. Relationships with job satisfaction and performance would be expected as a result of consistency among cognition (perception), affect, and behavior.

Method

Sample

Data for this study were collected within three plants operated by a heavy duty truck manufacturer. The plants were located in close physical proximity



to one another in the northeastern United States. The respondents were 220 first-line foremen. Participation in the study was voluntary, and the sample represented 81 percent of the foremen employed at the three plants. The overall response rate was in excess of 90 percent; however, approximately 9 percent of the returned questionnaires were eliminated on the basis of partial or unusable responses, yielding the final sample of 178.

The respondents had been with the company for an average of 11 years and had occupied the position of foreman for an average of 4.3 years. Over 50 percent of the sample had completed at least two years of college, and all of the subjects were male.

The distribution of foremen among functions within the three plants was as follows. Plant 1 employed 32 foremen. Of these, 27 supervised the assembly of truck axles; the remaining 5 foremen supervised maintenance operations. Plant 2 employed 32 foremen: 18 were in sheet metal fabrication; 5 in the wheel and axle machine shop; 4 in fire engine body fabrication; and 5 in production control. The remaining 116 foremen were from the third plant. This is the largest plant at the facility and is responsible for the actual assembly of complete trucks. The foremen were distributed as follows: heavy chassis production line, 12; light chassis production, 18; frame assembly, 18; can construction, 13; final assembly, 16; and production control, 49.

Measurement of the Variables

The majority of the data for this study were collected using questionnaires. The measures were administered by the researchers on company premises during working hours, in groups ranging in size from 15 to 40 members. The questionnaires required approximately 30 minutes to complete. Each foreman was asked to sign the questionnaire for research identification purposes.

Performance. Each foreman's job performance was rated by his supervisor on 15 performance dimensions (e.g., knowledge of job, quality mindedness, communicates effectively, recognizes work priorities). The measure was developed by the host organization and normally was used for basic personnel functions—promotions, merit adjustment, job changes. This rating was conducted expressly for use by the researchers and was not to be used for normal company purposes. The measures therefore should avoid sources of possible rater bias (halo, leniency) affecting measures of performance when these are used for personnel decisions (Guion, 1965).

Raw scores on each dimension were standardized, based on the mean and the variance for that dimension of the population of foremen and converted to percentile scores. Because these scores were highly intercorrelated, total performance scores were obtained by summing across all 15 items as recommended by Nunnally (1978). This yielded a normally distributed performance index that theoretically could range from 0 to 1500. The mean performance score in this sample was 757, with a standard deviation of 205. The internal consistency reliability of this index was $\alpha = .96$.

Job Satisfaction. Job satisfaction was measured using scales from the Job Descriptive Index (JDI) (Smith, Kendall, & Hulin, 1969). Schneider and Snyder (1975) noted that Smith et al. (1969) mixed descriptive and evaluative items in developing the work satisfaction scales for the JDI. Smith, Smith, and Rollo (1974) refactored the JDI work scale and reported loadings on both descriptive and evaluative factors. Because climate and satisfaction often are distinguished along precisely these dimensions (Hellriegel & Slocum, 1974; James & Jones, 1974), the possibility exists that previous climate researchers employing the JDI may inadvertently have analyzed relationships among alternative climate measures. To avoid such confounding, the work scale was factor analyzed using a principal components analysis with varimax rotation to determine if a dual factor structure existed. Two factors were obtained. These corresponded to the descriptive and evaluative dimensions found by Smith et al. (1974). Only the evaluative scale was analyzed in this research. The internal consistency reliability for this scale was $\alpha = .87$. The dual factor structure obtained for the work scale is confined to that scale only. The other scales from the JDI used in this research were satisfaction with pay, promotion, supervisors, and co-workers. The internal consistency reliabilities of these scales ranged from $\alpha = .73$ to $\alpha = .86$.

Climate. Dimensions of climate were measured using scales developed by Campbell and Pritchard (1969) and reported in research by Pritchard and Karasick (1973) and Abbey and Dickson (1983). Subjects were asked to describe, not evaluate, the climate within their respective plants. This process was intended to maximize the respondent's use of actual experiences as a basis for describing a climate. Items forming 10 a priori scales were selected on the basis of theoretical relevance and the previous experience of other researchers using this instrument. These scales were: autonomy, social relations, level of rewards, performance-reward dependency, motivation to produce, status polarization, flexibility-innovation, supportiveness, decision centralization, and structure.

A series of analyses assessed the psychometric properties of these scales. First, the scales were factor analyzed using the principal factor method (Harman, 1967). A 6-factor orthogonal solution was selected as most interpretable, and it explained 68 percent of the common variance. The items from the a priori scales that loaded on these factors subsequently were refactored to confirm the obtained structure. The reduced variable set exactly reproduced the 6-factor solution. Climate scores were calculated by summing scores of items loading on the six respective factors. The internal consistency reliability of each scale was assessed using coefficient alpha. Similar reliabilities have been reported by Abbey and Dickson (1983). The final dimensions, numbers of items comprising each scale, and associated internal consistency reliabilities are:

1. Rewards (7 items, $\alpha = .82$): the extent to which adequate rewards are available within the organization and are contingent on performance.
2. Autonomy (2 items, $\alpha = .70$): the extent to which employees are allowed to plan and schedule their work as they choose, as determined by rules and regulations and the actions of co-workers.

3. Motivation to achieve (3 items, $\alpha = .59$): the degree to which members of the organization are viewed as attempting to excel, to address difficult problems, or to advance themselves.
4. Management insensitivity (3 items, $\alpha = .56$): the extent to which foremen's superiors actively direct or intervene in the activities of their subordinates.
5. Closeness of supervision (3 items, $\alpha = .56$): the extent to which foremen's superiors actively direct or intervene in the activities of their subordinates.
6. Peer relations (3 items, $\alpha = .53$): the degree to which supervisors at equivalent organizational levels maintain warm and friendly relations.

Coefficient alpha is a lower bound estimate of internal consistency reliability that increases monotonically with the number of items comprising a scale. When the number of items is small, the mean interitem correlations provide a better indication of internal consistency. Nunnally (1978) recommends that these levels should exceed .25. All mean interitem correlations for these climate scales exceeded Nunnally's criterion.

Formation of Collective Climates

Collective climates were identified using a series of analyses that clustered individuals on the basis of profile similarity on the six climate dimensions. Clustering was performed within plants because subjects had been asked to describe the climate at that level of analysis. The procedures utilized correspond to those recommended by Wishart (1970).

Both hierarchical and nonhierarchical clustering techniques were utilized. Hierarchical techniques begin clustering at the individual level and successively aggregate individuals into groups, these groups into larger groups, and so on until one final group (the entire data set) is clustered. The researcher must decide at what point to terminate clustering, or which level in the hierarchy "best" represents the collective climates. When individuals are allocated to clusters using hierarchical methods, the results at succeeding levels of clustering generally are dependent. Consequently, allocation decisions made early in the clustering affect subsequent clusters, and nonoptimum clusters are generated (Wishart, 1970). Nonhierarchical methods may be used to refine these initial clusters to obtain a better solution.

Initial clusters were determined using Ward's (1963) method. Ward's procedure provides an index of the "cost" of further reducing the number of clusters in terms of the increases in pooled within-group sum of squares. When further clustering produces a discontinuity in the plot of sum of squares versus the number of climates, dissimilar groups were being combined and hierarchical clustering was terminated (see Ward and Hooke, 1963, and Schneider, 1974, for similar examples of this procedure).

After a set of initial clusters had been selected in this fashion, Wishart's (1970) nonhierarchical RELOC (a sub-routine of the CLUSTAN computer package) procedure was used to optimize the results. Each individual was

removed from his initial cluster, and euclidean distances to all cluster means were computed. If reallocation to an alternative cluster improved the solution (by reducing the pooled within-group variance), the subject was assigned to this cluster, and the new cluster means were computed. This procedure was repeated until cluster assignments were stable and subsequent iterations of the procedure failed to produce a decrease in pooled within-cluster variance.

Plant 1 was found to contain three collective climates; Plant 2, two climates, and Plant 3, eight climates. These findings support previous research by Schneider and Snyder (1975), Newman (1975), Johnston (1976), Drexler (1977), and Jones and James (1977) that multiple climates can be found within single formal organizations.

Three manipulation checks were performed to assess the adequacy of the clustering procedures. First, the average discrepancy within each collective climate (between individuals, within clusters) was compared with the discrepancy between that climate and the most similar other collective climate from that plant. The minimum ratio of between- to within-cluster discrepancy (using a measure based on d^2) provides a lower bound measure of internal consistency reliability. These statistics were 7.3 in Plant 1, 14.0 in Plant 2, and 7.2 in Plant 3, indicating reliable clusters.

The second check utilized multivariate and univariate analyses of variance to determine if differences existed among the final clusters' climate profiles. These results are shown in Table 1. With the exception of the closeness of supervision climate dimension in Plant 2, there were strong differences among the collective climates along the six climate dimensions utilized in this research.

Table 1
Climate Perceptions as a Function of Membership in Clusters

Climate Dimension	Plant 1		Plant 2		Plant 3	
	F	p	F	p	F	p
Multivariate	df=12,48 11.14	.001	df=6,25 16.37	.001	df=42,486 17.13	.001
Univariate	df=2,29		df=1,30		df=7,108	
Rewards	6.31	.01	35.15	.001	24.38	.001
Autonomy	7.34	.01	6.17	.02	11.62	.001
Motivation to achieve	5.98	.01	62.82	.001	13.17	.001
Management insensitivity	5.21	.01	12.41	.001	19.68	.001
Peer relations	15.18	.001	10.63	.01	25.60	.001
Closeness of supervision	16.82	.001	.69	.41	10.47	.001

As a final check on the reliability and stability of the clustering methods, measures of the intraclass correlation coefficients (Snedecor & Cochran, 1967) for each climate dimension within each of the three plants were computed. These measures provide point estimates of interrater reliability and can be interpreted as indicators of agreement (James, 1982). A high intraclass correlation coefficient indicates small within-group variance. Reviews

of the climate literature by James, Hater, Gent, and Bruni (1978), James and Sells (1981), Jones and James (1979), and Hater (1977) indicate that previously obtained values of intraclass correlation coefficients for climate research ranged from .00 to .50, with a median of .12. Of the 18 possible estimates of perceptual agreement (6 dimensions in each of 3 plants), 4 exceeded previously obtained values of this statistic, ranging from .56 to .79. Ten exceeded the median reported in these studies by at least 100 percent (range .24 to .42). Two roughly equaled median value of .12 (.10 and .14), and two intraclass correlation coefficients were unacceptable (.00 and .06 for closeness of supervision in Plant 2 and management insensitivity in Plant 3, respectively).

Results

Multivariate analysis of variance was used to test Propositions 1 and 2. The propositions were concerned with the main effects of climate membership on work performance and job satisfactions. The results of these analyses are presented in Table 2.

Table 2
Relationships Between Membership in Collective Climates and Performance and Satisfaction

Dependent Variable	Plant 1			Plant 2			Plant 3		
	F(2,29)	P	R ²	F(1,30)	P	R ²	F(7,108)	P	R ²
Multivariate—									
Work attitudes	3.76	.05		15.03	.001		2.14	.01	
Univariate—									
Work attitudes	2.23								
Work satisfaction	2.23	.13	.07	10.42	.01	.23	3.28	.010	.12
Supervisor satisfaction	.77	.47	.00	26.37	.001	.45	4.80	.001	.08
Co-worker satisfaction	1.44	.25	.03	10.49	.01	.23	4.90	.001	.19
Pay satisfaction	.74	.48	.00	1.65	.21	.02	1.83	.001	.04
Promotion satisfaction	8.79	.001	.33	44.36	.001	.58	7.38	.001	.28
Univariate—									
Job performance	5.14	.010	.21	6.81	.010	.16	1.83	.09	.05

Membership in a collective climate was significantly related to job satisfaction in Plants 2 and 3, but not in Plant 1 (with the exception of satisfaction with promotions). In some cases, these results were quite strong. Climate explained 58 percent of the variance in promotion satisfaction, and 45 percent of the variance in satisfaction with supervision in Plant 2. The possibility that these results are because of common method variance is diminished in light of the failure to obtain significant results in the first plant. Guion (1973) and Johanneson (1973) have argued that climate and satisfaction are redundant. If this were the case, climate and satisfaction should have been consistently and strongly related. The absence of such effects in Plant 1 and the lack of consistency across the three plants does not support the equivalence of these constructs.

Performance was associated with membership in collective climates in Plants 1 and 2 ($F(2,29)=5.14, p<.01$ and $F(1,30)=6.81, p<.01$, respectively). Performance was weakly related to collective climate in Plant 3 ($F(7,108)=p<.09$). Climate explained 21 percent of the variance in performance in Plant 1, 16 percent in Plant 2, and 5 percent in Plant 3. The strong relationship between climate and performance in Plants 1 and 2 is noted. Most previous climate research has not used performance as a criterion variable. In cases in which it has been used, results generally have been inconsistent and weak (Hellriegel & Slocum, 1974; Joyce & Slocum, 1979). Payne and Pugh noted that although "psychologists developed the concept of climate to measure the interaction of environment and personality (by operationalizing the E in Lewin's equation $B=f(P,E)$) and thus better predict behavior, there have been relatively few studies that have related these two variables" (1976, p. 1163). Research that jointly uses collective climates and individual difference measures (i.e., need for achievement, locus of control, etc.) promises to increase the proportion of explained variance in work performance.

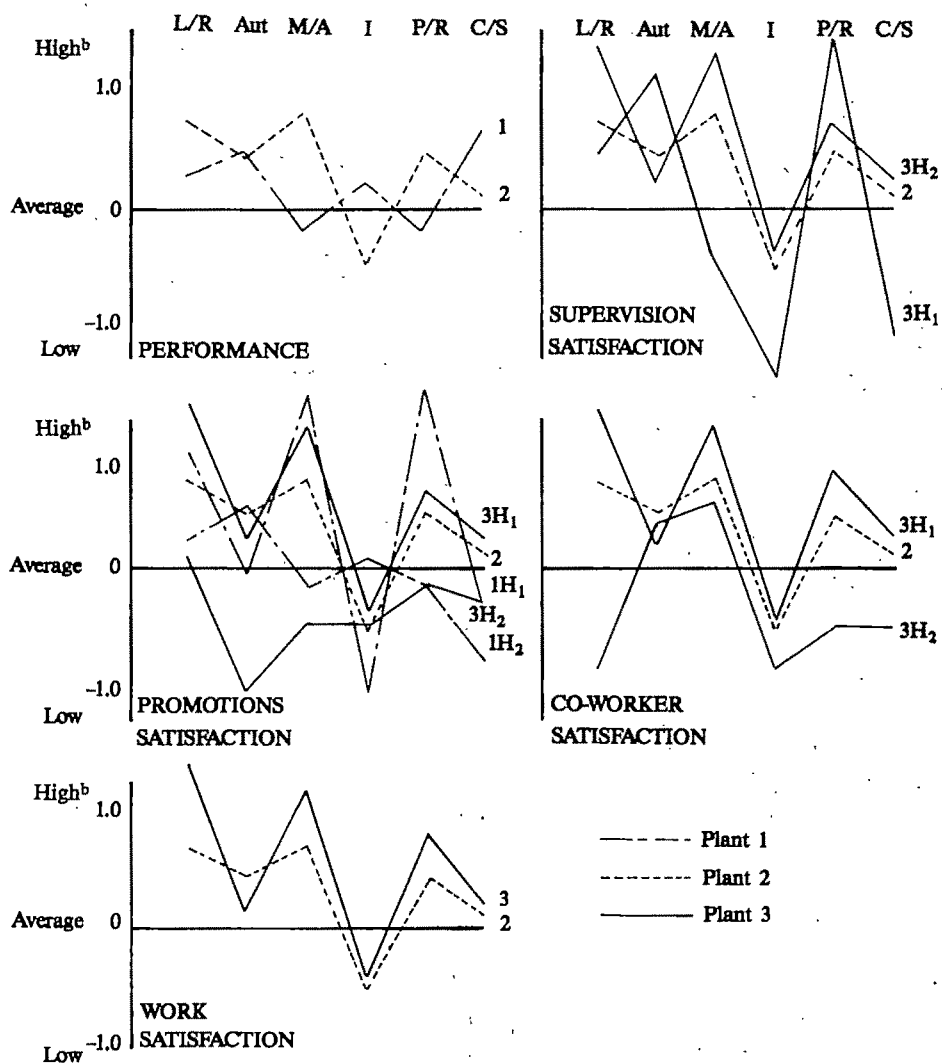
Additional Analyses

Two important issues have not been discussed. First, what factors affect the membership in a climate and, second, how is membership in particular collective climates associated with high performance and satisfaction.

Climates for High Performance and Satisfaction. The profiles of climates associated with high levels of performance and satisfaction are graphically displayed in Figure 1. Presenting the climates in this way allows an examination of the similarities and differences among them in terms of the shape, amplitude, and level of their profiles. These profile characteristics are not readily discernable from statistical measures of the relationship among profiles (Nunnally, 1978). Scheffé's method for multiple comparisons was used to identify the climates. Climates are shown in this figure only if their mean criterion scores differed significantly ($p<.05$) from the lowest mean score on that criterion dimension within their respective plants. These profiles, therefore, depict the pattern of mean climate perceptions reported by individuals within these high performance and high satisfaction climates. No analyses were conducted for pay satisfaction; the results of the univariate analyses of variance were not significant in any plant. In some plants, two climates had significantly higher satisfaction scores than others. These climates are shown in Figure 1 as the higher (H_1) or lower (H_2) *high satisfaction* climate for that particular facet of satisfaction. Designating one climate as high and the other as low is relative; both climates were significantly higher than other lower satisfaction climates for that plant.

The results for performance show that different climate profiles were associated with high performance in Plants 1 and 2. These results could be because of differences in the nature of the work performed within the different plants. Plant 1 performed primarily assembly and maintenance

Figure 1
High Criterion Climates from Three Plants^a



^aL/R=level of rewards; Aut=autonomy; M/A=motivation to achieve; I=management insensitivity; P/R=peer relations; C/S=closeness of supervision; H₁=higher and H₂=lower high satisfaction climate.

^bClimate scores were standardized across all 13 climates to allow a common scale for comparison. This procedure is recommended by Nunnally (1978).

operations; Plant 2 performed machine shop and sheet metal fabrication operations and also produced custom fire engine bodies. The different work processes suggest a distinction between the two plants in terms of technology (Slocum & Sims, 1980; Van de Ven & Delbecq, 1974).

The climates for high job satisfaction also can be examined for similarities and differences. An interesting finding is the *similarity between the shape of climate profiles from different plants associated with relatively high levels of specific facets of satisfaction*. Shape refers to the pattern of "peaks" in the profile, as opposed to the amplitude of these peaks, or the average level of the profile (Nunnally, 1978). Contrary to the results for performance, there are specific configurations of climate scores that are associated with various facets of job satisfaction across plants. Climates rated relatively high in rewards, motivation to achieve, and peer relations; average in autonomy and closeness of supervision; and relatively low in management insensitivity scored highest in satisfaction with work across plants. Similarities in the patterns of "peaks" in the profiles of collective climates from different plants were found for promotions, supervision, and co-worker satisfaction as well.

Previous research has paid very little attention to the configuration of climate scores. Given the origin of climate in Gestalt psychology (Koffa, 1935) and field theory (Lewin, 1936) and subsequent recognition of the need for multidimensional measurement (Barker, 1968; Evan, 1968; Taguiri, 1968), the neglect of configurational analysis is surprising. Only Frederiksen (1968), Schneider (1974), and Jones and James (1979) have examined patterns of climate to explain satisfaction and performance. The similarities in shape obtained in this research reemphasized the importance of configurational analysis.

When a single plant had more than one climate scoring significantly higher in satisfaction than other climates from that plant, these relatively high satisfaction climates (shown in Figure 1 and H_1 or H_2) also could be compared. In this case the relevant comparison is within rather than between plants. *Generally, these climates tend to have the same shape (with the exception of $1H_1$) but different amplitudes or mean levels*. The differences in level are logical. For promotion satisfaction, climate $3H_1$ is described as higher in rewards and motivation to achieve than the somewhat less satisfied group, $3H_2$. For satisfaction with co-workers, climate $3H_1$ reported higher levels of peer relations than $3H_2$, although closeness of supervision was higher for $3H_1$ than $3H_2$.

These analyses support the validity of climates formed on the basis of agreement. Climate was related to job satisfaction and performance at practically and statistically significant levels. Similar patterns of climate scores were associated with high levels of job satisfaction across plants. When a plant was found to contain more than one climate for high job satisfaction, differences in the amplitude and level of these climates were consistent with expected differences in the respective satisfaction scores.

Factors Associated with Membership in Collective Climates. If membership in different collective climates is associated with varying levels of satisfaction and performance, it becomes important to understand the factors that are associated with such membership. Two variables that potentially act as antecedents of climate membership are personal and organizational variables. In cases in which both individual and organizational variables have been

utilized jointly as predictors of climate; the limited evidence suggests that organizational characteristics have explained more variance in climate perceptions than personal characteristics (Dunham, 1977; Herman, Dunham, & Hulin, 1975; Newman, 1975). Consistent results, when found, often have been with positional measures of structure: job level (Gavin, 1975); hierarchical level (Schneider & Snyder, 1975); organizational membership (Drexler, 1977); work group membership (Herman et al., 1975; Newman, 1975). Positional measures of structure actually index several potential determinants of climate perceptions, including supervision, technology, co-workers, and so on. Despite this, relationships between organizational variables and climate perceptions have been unstable (Schneider & Reichers, 1983).

Terborg (1981) has suggested that facet analysis (Runkel & McGrath, 1972) could be used to explore how individual and organizational characteristics affect climate perceptions. Terborg suggests using four variable sets: "person characteristics, physical-technological characteristics, social-interpersonal characteristics, and time" (1981, p. 575). These four variable categories were employed and represented in this research as follows: person characteristics (age, education, time in position, work experience, managerial experience, and salary); physical-technological characteristics (function supervised); social-interpersonal characteristics (leadership, location in a common work area); and time (shift worked). Details concerning the measurement of these variables are presented in Joyce (1977). The results of analyses of their association with membership in collective climates are summarized in Table 3. Only simple effects of these variables were examined because of the large number of predictors and limitations of sample size. Terborg's (1981) paradigm does not indicate whether these sets or variables within these sets are independent or interdependent. It is believed that the variables probably are interdependent and the reader is cautioned about interpreting these as single variables.

The analyses were conducted using an extended series of contingency table analyses because of the categorical nature of the structural predictors and the criterion (climate membership). Values of the uncertainty coefficient are displayed along with the conventional χ^2 statistics and probability levels. Fisher's exact test was used when sample size precluded the use of χ^2 analyses. The uncertainty coefficient represents the decrease in criterion uncertainty when the predictor category is known.

In Plants 2 and 3, climate was associated with the context in which the foremen performed their jobs. Physical location was related to climate membership in Plant 2. In Plant 3, both location and function supervised showed significant relationships with climate membership. In both of these plants, the leadership style exhibited by the foreman's immediate supervisor was strongly associated with membership in a collective climate. These effects were particularly salient in Plant 2, for which the values of the uncertainty coefficient were .33 and .51 for initiating structure and consideration, respectively.

Table 3
Contingency Table Analyses—Individual and Organizational Antecedents of Collective Climates

Predictors	Plant 1			Plant 2			Plant 3		
	χ^2 (df)	P	Uncertainty Coefficient	χ^2 (df)	P	Uncertainty Coefficient	χ^2 (df)	P	Uncertainty Coefficient
<i>Organizational</i>									
Function supervised ^a	F**	.50	.01	F*	.11	.07	11.62 (6)	.07	.05
Location ^b	1.64 (2)	.44	.06	F*	.06	.11	17.68 (15)	.28	.07
Shifts	4.61 (2)	.10	.16	F*	.41	.01	.75 (3)	.86	.00
Leader initiating structure ^d	F*	.50	.10	F*	.00	.33	9.13 (3)	.03	.04
Leader consideration ^d	F*	.33	.02	F*	.00	.51	12.96 (3)	.01	.05
<i>Individual</i>									
Time in position	7.67 (2)	.02	.28	1.26 (2)	.53	.03	5.25 (5)	.81	.03
Work experience	6.93 (2)	.03	.24	2.88 (3)	.41	.08	12.40 (12)	.41	.05
Management experience	2.56 (2)	.28	.09	4.82 (3)	.19	.13	8.71 (9)	.46	.04
Age	9.40 (3)	.02	.34	1.06 (3)	.77	.03	17.03 (15)	.32	.07
Education	F*	.50	.01	.48 (3)	.79	.01	7.50 (6)	.28	.03
Salary	1.09 (3)	.78	.05	1.73 (2)	.42	.05	3.29 (9)	.95	.01

^aCoded by the operations performed by workers.

^bCoded by plant layout. Plant 1 had three physically distinct primary work areas; Plant 2 had three; Plant 3 had six. These areas were coded by the plant's industrial engineering staff.

^cPlant 1 had one shift; Plants 2 and 3 operated two shifts.

^dLeader initiating structure was measured by LBDQ, Form XII; leader consideration was measured by LBDQ, Form XII.

^eF* indicates reported significant levels calculated using Fisher's exact test.

In contrast, in Plant 1 climate perceptions were influenced by the foreman's time in position, work experience, and age. No effects were noted due to setting characteristics. These results are directly contrary to the results for Plant 2 and 3, for which no significant effects were obtained for individual predictors, but context factors were significantly related to membership in collective climates.

Discussion

This research has provided evidence that supports the validity of collective climates as one type of aggregate climate. Multiple collective climates were obtained within three different work settings, and membership in these climates was related to performance and job satisfaction.

Nature of Collective Climates

The findings of this study may be explained partially by the intersubjective nature of collective climate (Joyce & Slocum, 1979). Collective climates represent "learned environments" for participants working within them. To the extent that these climates provide a common frame of reference for participants, they would be expected to exert potent influences on individual performance and satisfaction. James (1982) has argued that this shared assignment of psychological meaning is a prerequisite for aggregation to a larger unit of analysis. This research provides empirical support for this position by showing that when such agreement exists, the derived aggregate climates show predictable and strong relationships to facets of satisfaction and job performance.

High reliability and the existence of a learned environment are not sufficient to explain the findings obtained in this research. Different climates were equally reliable, or learned, but were related to different levels of performance or satisfaction. A number of possibilities exist to explain these results. The first, and most obvious, possibility is simply that different climates have formed to allow the attainment of different work related outcomes. Within a setting, a number of climates may arise in response to the particular needs of the situation. Consequently, there may be a climate for performance, one for co-worker satisfaction, and for any number of other criteria—that is, turnover, absenteeism, commitment, and so on. When these climates are compared along a single criterion, one or more climates will appear more functional for the attainment of that criterion. Others, which may facilitate the attainment of other outcomes, will appear less desirable. This possibility may partially explain the results of this study. Within Plant 1, one climate was associated with relatively higher levels of performance and another with higher levels of promotion satisfaction. However, within Plant 2, a single climate was associated with higher levels of performance and all facets of job satisfaction. This variation in the nature of the collective climates therefore may only partially explain the results found in the study.

One less obvious possibility concerns the relationship among the climate dimensions themselves. With respect to a particular criterion, climates may be more or less consistent to the extent that the dimensions complement one another. Frederiksen (1968) found that subjects in consistent climates (e.g., innovation and autonomy, or rules and close supervision) performed better than did subjects in inconsistent climates. Frederiksen's previous results suggested a need to research climate multidimensionally. This study found theoretically interpretable consequences of the pattern, level, and amplitude of *profiles* or configurations of climate scores. Further study using complex multidimensional climate scores seems warranted (Joyce & Slocum, 1982; Payne & Pugh, 1976).

The internal structure of the aggregate climate itself could also explain the results of this study. James (1982) has argued that a valid aggregate climate concept requires a "composition theory" specifying how individual climate perceptions may be aggregated to allow the molar description of work settings in psychological terms. A composition theory specifies how "a construct operationalized at one level of analysis (e.g., psychological climate) is related to another form of that construct at a different level of analysis (e.g., organization climate)" (James, 1982, p. 219). As noted in this paper, a number of researchers have either explicitly or implicitly suggested perceptual agreement or consensus as the basis for such a composition theory, notably James and Jones (1974), Hellriegel and Slocum (1974), Schneider (1975), Joyce (1977), Joyce, Slocum, and Abelson (1977), Roberts et al. (1978), Joyce and Slocum (1979), Schneider (1981), James, (1982), and Schneider and Reichers (1983). Perceptual agreement is only the starting point for such a composition theory. Of equal importance is the *structure* or patterning of this agreement within organizations. Climates with similar mean profiles and average within-cluster homogeneity of psychological climate perceptions may differ considerably in terms of the patterns of agreement within them. To investigate this possibility, hierarchical diagrams of interindividual psychological climate similarities could be constructed for those aggregate climates showing similar mean profiles and estimates of perceptual agreement but different criteria scores. Differences between these structures could prove to be useful in an explanatory sense, particularly in combination with additional information concerning the organization's formal and informal structure and associated task, influence, and affective communication networks.

Some prior climate research has implied a rough equivalence between concepts of consensus and perceptual agreement. It should be noted that although these concepts are related, they are not equivalent. Consensus can exist on a number of different levels, the simplest one of which is perceptual agreement. Perceptual agreement requires only that subjects agree concerning their perceptions. They do not necessarily have to interact or have any knowledge that others in the organization share their perceptions. A second level of consensus requires that those agreeing have knowledge of others who share similar perceptions of the work setting. These concepts

obviously are different. With some exceptions, climate researchers have not been particularly precise in defining what they mean by agreement, consensus, shared perceptions, and the like. Some possible confusion accruing to theorizing and empirical results has occurred. At this point, further clarification and refinement of the concept of consensus in climate research is important.

Sources of Climate Perceptions

Schneider and Reichers (1983) categorize research concerning the sources of climate perceptions as either the structural or selection-attraction-attribution approaches. The structural approach proposes that it is characteristics of the organization's structure (e.g., size, span of control) that influence climate perceptions. The structural approach does not deny the influence of individual characteristics in determining the formation of climate perceptions, but primary consideration is given to structural factors. Climates should differ as these characteristics change from setting to setting. The selection-attraction-attribution argument proposes that individuals seek and are sought out by organizations to ensure an appropriate match between individual and organizational characteristics. This match then is improved through a process of attrition in which individuals move (quit, transfer) to affect better person-organization congruence, or the organization takes remedial action to correct initial mismatches through termination or transfer. Schneider and Reichers note that "similar perceptions and meanings arise and are expressed as climates due to the diminution of individual differences that has occurred through selection, attraction, and attrition" (1983, p. 34).

The results of this study provide support for both the structural and selection-attraction-attribution arguments. Within Plants 2 and 3, structural factors were related to climate membership, whereas within Plant 1 personal variables were the only ones associated with the criterion. There were no cases in which *both* personal and setting characteristics were related to climate. The lack of support for the structural position (particularly the failure to obtain location effects) in Plant 1 is especially of note. The process of formation and adjustment of climate perceptions would be expected to be consistent with models of attitude formation and adjustment. These representations of the cognitive process include the influence of social relationships and interaction between individuals perceiving a common social object—in this case, the work situation. This social relationship is defined partially by structure, and it therefore is interesting to find no relationship with structural variables in Plant 1.

One implication of this finding is a recognition that perception agreement can occur through two separate processes: *perceptual formation* and *perceptual adjustment*. When individuals perceive the situation similarly, agreement is the natural consequence, even in the absence of communication. Interaction based on physical propinquity may not be needed to produce agreement. Schneider and Reichers state that "if one combines similar

structures and similar kinds of people there is little doubt that distinctive organizational climates will arise" (1983, p. 22).

When the stimulus situation varies or is ambiguous, or if individuals vary, climate perceptions would likely differ. Agreement in this case could be obtained through a process of perceptual adjustment, which is heavily influenced by social interaction. This position is what Schneider and Reichers (1983) refer to as the "symbolic interactionism" perspective. The relative importance of processes of perceptual formation and adjustment as determinants of agreement in climate perceptions is unknown. If the possibility of discrepant perceptions is high (because of differences in personal or setting characteristics), the interaction necessary for perceptual adjustment is great. Through this interaction, agreement may be achieved. If perceptual formation processes ensure similar initial climates, interaction may do little toward, and may even disturb, agreement.

A second interpretation of the failure to find significant location effects in Plant 1 is that interaction is important, but that it is more complex than simple within group interaction that would be reflected by common location measures. For example, members of integrating departments could spend more time in task related interactions away from their assigned work place, or informal groups composed of members from other locations may have strong influences on climate perceptions. An additional and related possibility is that interaction *off* the job may significantly influence climate perceptions. In the present study, the sample included many individuals who were related either directly or through marriage and who consequently could be expected to socialize to a significant extent away from work. If conversation covered work related topics during these family activities, climate perceptions could be influenced. Although only speculative, these considerations are possible and suggest the need for more rigorous measures of interaction, possible employing network concepts (Joyce, Walker, & Howard, 1980; Schneider & Reichers, 1983; Tichy & Fombrun, 1979).

In conclusion, it is believed that these observations (the need for multi-dimensional explanation, analysis of the internal structure of aggregate climates, use of refined concepts of consensus, and study of the influence of social networks), if heeded, likely will lead to more complex climate research. This work promises to contribute to the development of an adequate composition theory of aggregate climate and the subsequent usefulness of the collective climate concept.

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A Field Study of the Use and Perceived Effects of Discipline in Controlling Work Performance¹

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Data from two samples of supervisors in a large U.S. corporation show that (1) supervisors used discipline primarily as a response to certain behaviors and when the work context was supportive of its use; and (2) use of discipline had small but significant effects on the subsequent work performance of target employees.

Formal organizations are social structures formed to coordinate the behaviors of members so that collectively they can attain some goal or purpose (Mintzberg, 1979). Coordination is impossible if behaviors are completely unpredictable; thus coordination requires some degree of control over behaviors. In situations of relative predictability, the impersonal controls provided by standardization of work processes, skills, or outputs can be used effectively to coordinate behavior. In situations with little predictability, however, the interpersonal controls provided by direct supervision and mutual adjustment are necessary to achieve coordination (Mintzberg, 1979).

The major sources of unpredictability usually discussed in the organizational literature are the technologies and environments of organizations. Another obvious source of unpredictability—largely ignored by organizational researchers—is the deviant behaviors of organizational members. Like other sources of unpredictability, deviant behaviors probably are controlled most effectively by the personal interventions of those closest to the disruption—that is, by direct supervisors and co-workers of the deviant members.

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In all forms of social organization, social processes emerge that are overtly aimed at maintaining a predictable social order by discouraging individual deviance and encouraging individual conformity; prominent among these means of control is the use of positive and negative sanctions (Pitts, 1968). Despite the common use of negative sanctions in organizations, as in social life generally (Bandura, 1977; Hamner & Organ, 1978), organizational researchers generally have tended to pay much more attention to positive sanctions as ways to encourage conformity (Beyer & Trice, 1981a) than to negative sanctions as ways to discourage deviance.

This study uses data from two nationwide samples of managers of a large corporation to investigate both the use and the effects of negative sanctions by exploring: (1) the frequency with which managers take disciplinary actions to deal with deviant behaviors of subordinates defined as difficult problems; (2) which factors are associated with the use of particular forms of discipline; and (3) which forms of discipline are associated with managers' perceptions of improvement in these subordinates' behaviors.

Past Research on Discipline

The Organizational Literature

Empirical studies of discipline by organizational researchers have tended to focus on variables affecting supervisors' use of positive and negative sanctions. In a recent review, Podsakoff concluded that such research "is still in its infancy" (1982, p. 76). He summarized the results for variables that had been investigated as predictors of the use of sanctions in three categories: contextual variables, subordinate behaviors, and supervisory characteristics. Relatively few studies used common measures, but from those that did he was able to reach some general conclusions. He found that one of the most consistent determinants of the use of sanctions was the performance level of the subordinate involved. Other consistent determinants included supervisors' past experiences with the use of sanctions and their attributions for the causes of poor performance. In his suggestions for future research, he mentioned other subordinate behaviors, supervisory characteristics, task complexity and structure, situational stressors, and other contextual factors among the variables deserving further study as determinants of supervisors' use of sanctions.

In an earlier review article focused on the *effects* of punishment, Arvey and Ivancevich (1980) noted that there had been few empirical studies to support the rather general disapproval of its use. Nevertheless, widespread beliefs persist—based mostly on operant conditioning theory (Skinner, 1971)—that punishment is counterproductive or of little value. According to this view, punishment has limited, immediate positive results that are soon washed out by numerous undesirable side effects—such as emotional reactions—that are more difficult to deal with than the original problem (Connellan, 1978; Luthans & Kreitner, 1975). Also, although punishment can

be successful in decreasing or eliminating an undesirable behavior, theory says it will not necessarily lead to desirable behaviors. Punishment only increases the likelihood of the desired response if no alternative to the desired response is possible (Kerr & Slocum, 1981). When Solomon reviewed the issue, he also questioned "persisting legends concerning the ineffectiveness of punishment . . . as well as the inevitability of neurotic outcomes" (1969, p. 140). Arvey and Ivancevich commented that "negative connotation" and "public denial" are "not sufficient reasons to dismiss punishment as a potential management approach for modifying and controlling behavior" (1980, p. 131).

From these review articles and the authors' own examination of the organizational literature, it is clear that relatively little data have been generated on the effects of sanctions, especially the effects of negative sanctions. Another limitation of past research is that many studies used hypothetical subordinates and contrived situations (Baum & Youngblood, 1975; Ilgen & Knowlton, 1980; Ilgen, Mitchell, & Fredrickson, 1981; Maier & Danielson, 1956; Mitchell & Kalb, 1982; Mitchell & Liden, 1982; Mitchell & Wood, 1979; Pence, Pendleton, Dobbins, & Sguo, 1982; Rosen & Jerdee, 1974; Wood & Mitchell, 1981). In only a few (Mitchell & Kalb, 1982; Mitchell & Liden, 1982) were some confirmatory results obtained from real supervisors about their subordinates. Thus, it has not yet been demonstrated that conclusions (Mitchell, Green, & Wood, 1981) drawn from most of these studies apply to supervisors in real organizations, who confront a multitude of constraints—such as pressures from other subordinates and unions (Edwards & Scullion, 1982)—that can be ignored in responding to hypothetical or contrived situations.

Two exceptions should be noted. Kipnis and his associates (Kipnis, 1976; Kipnis & Cosentino, 1969; Kipnis, Silverman, & Copeland, 1973) combined laboratory studies with field research on subordinates to investigate the use of coercion along with other types of power; Kipnis (1976) concluded that both positive and negative sanctions are most likely to be used when power-holders do not expect to be successful in using their influence. In another study conducted in natural settings, O'Reilly and Weitz (1980) found that supervisors' use of informal warnings, formal warnings, and discharges was positively related to group performance.

The HR and IR Literature

Perhaps because its use plays a prominent role in grievance and arbitration cases, discussions of discipline are much more common in the literature on human resources (HR) and industrial relations (IR). Writers in these fields tend to consider discipline as sometimes unavoidable in managing deviant employees (Chamberlain & Cullen, 1971; Davey, 1982; Dessler, 1979; Ginsberg, 1959; Steinmetz, 1969; Strauss & Sayles, 1980), but they are concerned to moderate its coercive, punitive aspects (Black, 1970; Huberman, 1964, 1975; Jones, 1961). As Wheeler expressed it, the ideal approach to discipline

is seen as "much more positive than authoritarian; it does not place reliance on fear—but attempts to build self-discipline" (1976, p. 237). However, some writers in these fields are less enthusiastic (Booker, 1969; Megginson, 1977; Miner & Miner, 1973; Strauss & Sayles, 1980).

Empirical studies of discipline in the HR and IR literature have tended to concentrate on the *effects* of discharges on target employees and have produced conflicting results. Some studies have found both favorable and unfavorable effects, depending on the type of offense (Jones, 1981); others have found largely negative effects (Somers, 1975; Trice & Belasco, 1966); and some have found positive effects (McDermott & Newhams, 1971; Ross, 1957; Steinmetz, 1969). These mixed results could have occurred because studies involved different types of employees and the effects of personal characteristics such as age, sex, or status were not controlled or investigated.

No studies could be found on the effects of milder forms of formal discipline—written warnings, suspensions without pay, or demotions. Regarding the use and effects of informal forms of discipline, some evidence suggests that discussions and oral warnings are effective with the target employee (Huberman, 1975), particularly with alcoholic employees (Edwards, Orford, Egert, Guthrie, Hawker, Hensman, Mitcheson, Oppenheimer, & Taylor, 1977). However, a survey of 100 firms revealed that of the 83 percent who had used "threats of discipline," only 44 percent considered them effective (Miner & Brewer, 1976).

Methods

This study is part of a larger study evaluating the effectiveness of a job-based program in dealing with problem-drinking employees. Such programs provide an excellent opportunity to study the use and effects of discipline because the policies on which the programs are based advocate the use of progressive discipline to motivate problem-drinkers toward rehabilitation (Trice & Beyer, 1982). Also, because problem drinkers are notoriously resistant to rehabilitation efforts, supervisory actions taken in implementing such a program with problem-drinking subordinates are likely to include the full range of disciplinary actions from informal discussions to discharge.

Sampling

Data were collected from a stratified random sample of 19 locations of a large U.S. corporation that has had a job-based alcoholism program incorporating progressive discipline since the 1950s. This company employs a wide range of technologies in over 50 major locations throughout the United States to innovate, manufacture, sell, install, and service a wide range of products within a single industry. Strata were formed so that all major types of locations (manufacturing, service, and installation) and all geographical regions would be represented. Within each location, data were collected from two types of managers: (1) a systematic sample ($n=153$) of

one-half of all supervisors who had referred a subordinate with a drinking problem to the company alcoholism program within the three years prior to the study were interviewed about how they had managed that employee; (2) a systematic sample ($n=321$) of one-tenth of all other managers were interviewed about how they had managed a subordinate who had been a difficult problem for them during the same three-year period. The second sample was included in the study to investigate whether the presence of the alcoholism policy made any difference in how supervisors disciplined problem subordinates and in how effective discipline was. For the purposes of this research, data from the two samples were combined.

Both samples of supervisors were also asked whether they had had subordinates they suspected were problem drinkers but did not refer into the company program. The same proportion—41 percent—in both samples reported such subordinates. The most frequently given reason for not referring these subordinates into the company program was that their work performance was not adversely affected. Without deficient performance, there is no legitimate basis on which supervisors can intervene in such cases with either help or discipline. Most supervisors reported they were “watching” these subordinates carefully.

Data Collection

A year of exploratory interviewing, general observation, and pretesting at locations that did not fall into the final sample preceded the final data collection. During this time it was determined that interviewing the supervisors involved was the only practical way to collect detailed data on the management of problem employees. Pretesting revealed that supervisors readily recalled incidents involving discipline. In cases involving alcoholic employees, administrators of the alcoholism program also were often present during informal discussions with the employee and were generally familiar with what had happened in the cases. It was possible to collect some of the same data from supervisors and program administrators on 38 cases at 5 pretest locations to help assess the accuracy of the recall of supervisors about these discussions. Spearman correlations between these two sets of data averaged .81 over six items. Also, test-retest reliabilities obtained by interviewing a sample of 40 of the same supervisory respondents at two-week intervals averaged .91 for 30 items involving recall.

Furthermore, longitudinal (1965-1977) data collected independently through a company reporting system on the entire population of the company's problem-drinking employees were in general agreement with data obtained in this study on the overall improvement in performance of alcoholic employees (Beyer & Trice, 1981b). The data reported here (on 5-point scales) indicated that 74 percent had improved; the company data (on 3-point scales) indicated that 70 percent had improved. Given that the data are from different samples of supervisors reporting on different time periods, the two sets of data show remarkable agreement.

All of the final data were obtained by trained interviewers, including the authors, in private interviews with managers falling into the two samples within each of the 19 sampled locations. Respondents were told the overall purpose of the study, the university connections of the investigators, that the study was funded through a government grant, that the authors were not working for the company, that all responses were confidential, that all data would be reported in aggregate form so that no respondents or locations could possibly be identified, and that they had the right to decline to be interviewed. The data collection instrument consisted largely of paper-and-pencil questionnaire-type items with structured response formats, but it included some open-ended questions (asked by the interviewer) designed to elicit details of what happened. Only four potential respondents declined to be interviewed. During the interviews, which typically lasted from 1 to 1½ hours, interviewers had special copies of the instrument from which they read open-ended questions and on which they recorded answers. Respondents recorded their answers to closed-format questions on separate copies of the instrument, with interviewers present to answer questions and provide clarification, if needed.

Independent Variables

Because of the relative paucity of past results on the use and effects of discipline in actual work settings, the study was designed to be somewhat exploratory. Review of the literature and fieldwork suggested a rather general and comprehensive model that guided the choice of variables and data analyses. This model included five categories of variables likely to be associated with the use and effect of discipline: (1) characteristics of the target employee, (2) characteristics of the supervisor using the discipline, (3) characteristics of their interaction, (4) variables describing the surrounding organizational context, and (5) variables describing the specific behaviors and events that precipitated the use of discipline. Kipnis (1976) considered behavior of the target, the social setting, and personal characteristics of the powerholder. Thus, variables in categories one and three can be considered as additions to his model.

Employee Characteristics. Previous research suggested that personal characteristics of target employees are related to a supervisor's use of discipline. The present study investigated age (Stoeberl & Schniederjans, 1981); sex (Larwood, Rand, and der Hovannessian, 1979; Pence et al., 1982; Podsakoff, 1982; Stoeberl & Schniederjans, 1981); and organizational status (Rosen & Jerdee, 1974; Trice & Beyer, 1977).

Supervisor Characteristics. Similarly, personal characteristics of supervisors—such as age, sex, ethnicity, education, supervisory level, and ideologies—could be related to their use of discipline. Of these supervisor characteristics, only sex had been previously investigated, with inconsistent results (Podsakoff, 1982). However, O'Reilly and Weitz (1980) found that supervisors' leadership style was related to their use of discipline, and Maier and

Danielson (1956) concluded that peoples' feelings and attitudes influenced the way they handle rule violations. In the present study, managerial ideologies—reflecting the importance that supervisors assign to various aspects of their roles, and their attitudes toward employees—were investigated (Beyer & Trice, 1981a). From 18 statements "about your philosophies on management," 5 scales were derived, based on factor analytic results: humane pragmatism ($\alpha = .66$), reflecting a dual concern with productivity and employee welfare; Protestant ethic ($\alpha = .51$), reflecting concern for personal responsibility; social determinism ($\alpha = .47$), reflecting beliefs that poor performance is a result of personal problems originating outside the workplace; laissez-faire ideology ($\alpha = .57$), reflecting a philosophy of noninterference in employee problems; and social responsibility ($\alpha = .47$), reflecting beliefs that managers should actively help employees and society. Given the exploratory nature of this study, the reliabilities obtained were considered adequate (Nunnally, 1967). (Further details on these and other measures used in this study are available from the authors.)

Interaction Characteristics. Five variables describing the basis and nature of the interaction between the supervisor and target employees relative to discipline that had not been previously investigated were included in this study. They were: age dissimilarity, sex dissimilarity, whether the respondent was the target employee's immediate supervisor, the length of time the respondent had supervised that employee, and how long the respondent delayed taking action after detecting a serious problem with that employee. The dissimilarity variables were measured by computing the absolute differences between identical codings of the age and sex of supervisors and of their target employees.

Contextual Variables. Consistent with and extending Podsakoff's (1982) suggestions, 18 variables measuring various aspects of the context in which the target employee's deviant behavior and the supervisor's subsequent discipline took place were included in this study. They were: type of location; supervisor's tenure in the company and in the position; span of control; supervisor's perceived overload ($\alpha = .68$); supervisor's reported formal authority and informal influence; the routineness of the technology ($\alpha = .73$) and the amount of technological change in the prior three years ($\alpha = .87$) in the work unit involved; how many soft and hard performance criteria were used to judge subordinate performance; how visible the performance of subordinates was in that work unit ($\alpha = .66$); how much pressure the supervisor felt from the union in his or her particular position ($\alpha = .74$); how much influence the union had in the location as a whole ($\alpha = .56$); and three measures of supervisor's expectations of what would happen if he/she used the company alcoholism policy (negative expectations, $\alpha = .68$; positive expectations, $\alpha = .49$; please management, $\alpha = .62$). The overload scale was taken from Khan, Wolfe, Quinn, Snoek, and Rosenthal (1964). Other measures were adapted from earlier research (Beyer & Trice, 1978) or devised especially for this study. All those with Cronbach alphas reported above were

multi-item Likert-type scales based on results of factor analysis. Other measures were relatively factual responses to single questions. The remainder—authority, influence, and performance criteria—were summations of the number of items checked in relevant lists.

The Specific Situation. Perhaps the most consistent finding across the studies reviewed (Podsakoff, 1982) is that supervisors' use of sanctions is related to subordinates' behaviors; supervisors tend to reward good performance and punish poor performance. In order to investigate further the specific behaviors and situations involving subordinates that led to supervisors' use of discipline, this study included four variables: the supervisor's assessment of the magnitude of the problem presented by the target employee ($\alpha = .84$) and of the work performance of this employee at the time action was first taken by the supervisor ($\alpha = .86$); whether the alcoholism policy was seen as applicable to that employee by the supervisor; and the actual deviant behaviors of this employee observed by the supervisor on three dimensions—severe work dysfunction ($\alpha = .58$), accidents ($\alpha = .50$), and poor social adjustment ($\alpha = .42$). The time that had elapsed between the supervisor's first detecting the target employee's problems and the researchers' interview also was included as a control variable.

Dependent Variables

Two kinds of dependent variables were employed. The first measured supervisors' use of several types of discipline. The second measured supervisors' assessments of later job performance as an indicator of perceived effectiveness of the discipline used.

Supervisors' reports indicated that four types of discipline were most prevalent in the company: informal discussions and warnings, written warnings, temporary suspensions, and discharges. Transfers and demotions occurred too infrequently to permit analysis. However, supervisors reported that some employees had left their jobs "voluntarily." Because it is possible that these employees were, in fact, somehow pressured to leave, this variable also was included as a possible indicator of the use of discipline. Seven measures of supervisors' use of discipline were derived and employed as dependent variables. The first two related to supervisors' use of informal discussions and oral warnings. Supervisors were asked to check, from a list of general topics derived from other supervisors in pretest interviews, which topics had been covered in informal discussions they had held with target employees. The numbers of constructive (e.g., employee's explanation of own work performance, possible counselling services, other ways to get help) and confrontive (e.g., employee's poor work performance, possible disciplinary steps, effects on employee's work record) topics checked on these lists were used as separate dependent variables. The other five measures of discipline used were: whether a written warning had been used; whether one or more temporary suspensions had been used; the total number of days suspended;

whether the employee had left the company "voluntarily"; and whether the employee had been discharged.

The dependent variable for analysis of the effects of discipline was the supervisor's evaluation of the target employee's work performance at the time of the authors' interview. Supervisors were asked to rate employees along eight frequently used dimensions in a format in which they also rated their best and worst employees. Ratings then were averaged to form a single scale ($\alpha = .91$). Analyses supported the convergent and discriminant validity and test-retest reliability of these measures (Beyer & Trice, 1984).

Results

Frequency of Discipline

Most supervisors in the samples used some form of discipline to deal with employees they considered difficult problems. Over 95 percent had at least one informal discussion with the problem employee. The great majority—76 percent—used *both* constructive and confrontive topics in these discussions. A minority used *only* constructive (13 percent) or confrontive (7 percent) topics in these discussions. Written warnings, which are formal and more punitive because they become a permanent part of the employee's work record, were used in 49 percent of the cases. Even suspension without pay was used quite frequently; 27 percent of these problem employees had been suspended, for an average of about 4 days. Discharge was used with only 3 percent of these cases, but another 7 percent of these employees left the company. Clearly, despite the strong international unions that represented most employees in these companies, it was possible to get rid of some disruptive employees.

Use of Discipline

In analyzing which independent variables were associated with the use of various types of discipline, multivariate statistical techniques were used so that the separate contributions of each variable and group of variables could be assessed. Multiple regression was used when the dependent variable was an interval measure: for constructive topics, confrontive topics, and days suspended. Discriminant analysis was used when the dependent variable was a category variable: for written warnings, temporary suspensions, leaving the company, and discharges.

Preliminary analyses were run using each subset of independent variables with each of the measures of discipline as the dependent variable. On the basis of these results, 13 variables that produced only one or no significant relationship with the 7 measures of discipline were eliminated from further consideration.

In the final analysis the five subsets of independent variables were entered into equations in a hierarchical fashion, with all employee characteristics

being entered in the first step, all supervisory characteristics in the second, and so on. This procedure permitted assessment of the relative strength of the association between each group of independent variables and the supervisors' use of each type of discipline.

Table 1 summarizes the results obtained for the final analyses. Each row of the table represents a separate hierarchical analysis. Cumulative R^2 s are given for the multiple regression results, along with the statistical significance of the equation for each step of the analysis. Wilks' lambdas are given for the discriminant analysis because this statistic also indicates how much information has been accounted for by the independent variables used; however, the smaller lambda is, the better the battery of independent variables. In the final column, the multiple R statistic is provided for the regression results and the canonical correlation (R_c) is provided for the discriminant analysis results to facilitate comparisons of the overall results across these two types of analyses.

Table 1
Summary of Results of Multivariate Analyses of Use of Discipline
Using Hierarchical Inclusion of Groups of Selected Variables

	Cumulative Results									
	Employee Characteristics		Supervisor Characteristics		Supervisor-Employee Interactions		Contextual Variables		Specific Situational Variables	
<i>Multiple regression results</i>	R^2	p	R^2	p	R^2	p	R^2	p	R^2	R
Constructive topics	.01	.28	.01	.11	.05	.10	.11	.01	.19	.44
Confrontive topics	.02	.12	.04	.04	.05	.07	.14	.00	.47	.68
Days suspended	.03	.00	.05	.01	.06	.02	.12	.00	.26	.51
<i>Discriminant analysis results</i>	λ	p	λ	p	λ	p	λ	p	λ	R_c^a
Written warnings	.96	.00	.93	.00	.91	.00	.86	.00	.66	.58
Temporary suspensions	.94	.00	.94	.00	.93	.00	.88	.00	.73	.52
Left company	.98	.09	.96	.07	.95	.05	.90	.04	.87	.36
Discharged	.98	n.s.	.98	n.s.	.97	n.s.	.91	.07	.89	.33

^a R_c = canonical correlation.

The results in Table 1 show that the specific situational variables are the most important predictors of the use of all types of discipline. Contextual variables are the next most important predictors. Employee, supervisor, and interaction characteristics are relatively unimportant in predicting the use of discipline. There were, however, some individually significant relationships between variables in all categories and the use of discipline. Table 2 gives a summary of the significant results for individual independent variables from the equations summarized in Table 1 and also indicates the direction of the results.

Considering employee characteristics, these results reveal: that younger employees experienced more confrontive topics, but older employees were more often suspended and left the company; that male employees were more often suspended or discharged; and the professional or managerial employees were less often given written warnings or suspensions.

Table 2
Summary of Significant Relationships on Use of Discipline

Predictor Variables	Results Obtained					
	Constructive Topics	Confrontive Topics	Written Warning	Temporary Suspension	Days Suspended	Left Company
<i>Employee characteristics</i>						
Age	...	---	...	+	...	++
Sex (hi=female)	---
Professional/managerial status	---	---
<i>Supervisor characteristics</i>						
Age	---
Ethnicity (hi=nonwhite or Hispanic)	++
Social responsibility	+	+
<i>Interaction characteristics</i>						
Age dissimilarity	...	---	---
<i>Context</i>						
Manufacturing	...	++	++
Service	++	++	...	++
Span of control	++	+	++
Time in company	...	++
Authority	...	++	...	+	+	...
Informal influence	...	++
Technological change	---
Hard criteria
Viability of performance
Union influence	...	---	...	---	---	...
Positive expectations	---
Please management	++
<i>Specific situation</i>						
Magnitude of problem	...	++	++	++	++	++
Work performance	...	---	---
Work dysfunction	++	++	++	++	+	...
Poor social adjustment	...	++
Policy applicable	++	++	++	++	++	...
Time elapsed	++	++	+	...

+ = positive relationship; - = negative relationship; + or - indicates $p < .10$; ++ or -- indicates $p < .05$; +++ or --- indicates $p < .01$

Results for supervisory characteristics are more scattered and mixed. Younger and nonwhite supervisors used more written warnings; those who more heavily endorsed the ideology of corporate social responsibility suspended their problem subordinates for longer periods, and their subordinates more frequently left the company.

On the interaction characteristics studied, only age dissimilarity was significantly related to the use of discipline. Supervisors who were more similar in age to their subordinates more frequently used confrontive topics and written warnings.

Among the contextual variables, type of location, span of control, supervisors' authority and influence, and union influence produced the most consistent significant relationships: The results for the two location variables indicate that supervisors in the omitted category of location (installation) used less discipline. Those with more authority tended to be more punitive, using confrontive topics and suspensions more than other supervisors. Supervisors who saw the union as highly influential were less likely to use confrontive topics and suspensions. Also, supervisors with less tenure had fewer discharges; those with greater informal influence used more confrontive topics; those whose work units had greater technological change used temporary suspensions less frequently; those who had hard criteria available to judge subordinate performance used fewer days of suspension; those whose subordinates' work was highly visible and those who expected their use of alcoholism policy to please management more often had subordinates who left the company or were discharged; and those who expected favorable outcomes from using this policy used fewer constructive topics.

Situational variables were most consistently related to all forms of discipline. When supervisors thought their employees presented a bigger problem, they used more of all forms of discipline except constructive topics. Also, the lower the employees' work performance and the greater the employees' work dysfunction, the more they tended to use several forms of discipline short of discharge. Employees seen as having poor social adjustment provoked only confrontive topics in informal discussions. On the other hand, those for whom the alcoholism policy was deemed applicable experienced more constructive topics as well as formal discipline short of termination. Finally, the use of written warnings and suspensions was significantly related to the time elapsed between the beginning of the supervisor's noticing the problem and the actual date of the study interview, suggesting that many employees defined as problems are likely to experience eventually the more severe and formal forms of discipline.

Effects of Discipline

Three multiple regression analyses were performed. In the first analysis, work performance following discipline was the dependent variable, and the six forms of discipline were used as independent variables. This analysis was designed to show the direction and magnitude of relationships between

each form of discipline and supervisory perceptions of subsequent work performance. Employees who left the company had to be retained in these analyses to avoid biasing the results. Because these employees' performance obviously could not be assessed at the time of the interview, their supervisors were asked to assess their performance at the time they left the company. In the second analysis, initial work performance was controlled by entering it as a separate step before the discipline variables. This analysis was designed to separate out any effects of initial work performance on subsequent work performance and to control for these effects on the relationships between forms of discipline and subsequent work performance. In the third analysis, all of the independent variables used in previous analyses predicting the use of discipline were entered into the equation before the discipline variables. This analysis could uncover any independent effects of employee and supervisor characteristics, interaction variables, the work context, and the specific situation on subsequent work performance, and also control for the effects of all of these variables on the relationships between form of discipline and subsequent work performance. Results of these three analyses are summarized in Table 3.

Table 3
Results of Multiple Regression Analyses Predicting Performance Following Discipline

	<i>Without Controls</i>		<i>Controlling for Initial Performance</i>		<i>Controlling for All Predictor Variables</i>	
	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>
Constructive topics	.13	.007	.09	.025	.07	.096
Confrontive topics	-.24	.000	.01	n.s.	.02	n.s.
Written warnings ^a	-.24	.000	-.13	.003	-.15	.002
Temporary suspensions ^a	.14	.012	.08	.082	.05	n.s.
Days suspended	-.08	.080	-.07	.056	-.10	.008
Left company ^a	-.16	.000	-.13	.000	-.12	.001
R ² for control variables alone	—	—	.465	.000	.577	.000
R ² with discipline variables added	.17	.000	.504	.000	.616	.000
R ² change	—	—	.039	.0005	.039	.0005

^aDummy variables.

The results of the first analysis with only the discipline variables in the equation (the first two columns of Table 3) indicated that, by themselves, all forms of discipline were significantly related to subsequent work performance. Constructive topics used in informal discussions and whether or not the employee had been temporarily suspended had positive effects. Confrontive topics, written warnings, and the length of suspensions had negative effects. Of the variance in subsequent work performance, 17 percent was accounted for by the discipline variables alone. The results of the second analysis (shown in the third and fourth columns of Table 3) show that (1) initial work performance is a powerful predictor of performance following discipline; (2) although attenuated, significant effects remain for most of

the discipline variables after controlling for initial work performance. Only confrontive topics is no longer significant. Although modest, a significant increment in the variance accounted for was contributed by the discipline variables.

Without a consideration of mean levels of performance, however, these results were somewhat ambiguous; negative beta coefficients could indicate either declines in performance or relatively lower improvements in performance. Therefore, paired *t*-test analyses (not shown) also were performed to assess whether disciplined employees improved or declined significantly in work performance. For each form of discipline, two groups were formed on a dichotomous basis (yes/no for dummy variables; above/below the mean for others). The relationships of initial performance to subsequent performance then were assessed separately for each group. Results showed that, on the average, both disciplined and nondisciplined employees improved in work performance (*t* values ranged from -6.19 to -12.40 , $p = .00$). Some employees, however, did decline in performance; the differences between ratings of initial performance and subsequent performance ranged from -1.625 to $+3.125$. Inspection of the means revealed that, in general, disciplined employees had poorer initial work performance than did employees who were not disciplined. There was one exception, however. Initial and subsequent work performance ratings were very similar for employees who had and had not experienced constructive topics in discussions with their supervisors (the respective means were 2.83 and 2.90 for initial performance, 3.28 and 3.27 for subsequent performance).

The results of the third regression analysis (shown in the fifth and sixth columns of Table 3) show that, with all of the previous independent variables controlled, three forms of discipline—constructive topics, written warnings, and days suspended—remained significant; the first was positively and the other two were negatively related to subsequent work performance. Also, the increment in R^2 obtained by adding the discipline variables to the equation remained statistically significant—even with all of these controls.

As in the analyses of the use of discipline, the five sets of control variables were added to the regression equation in groups. Cumulative R^2 s were close to zero and not significant with the first three groups—employee characteristics, supervisor characteristics, and interaction variables—in the equation. When the contextual variables were added, the R^2 rose to $.10$ ($p = .04$). Regression coefficients indicated that informal influence and visibility of performance were significant positive predictors, and that manufacturing or service location and formal authority were significant negative predictors of subsequent work performance. When the variables describing the specific situation were added, the R^2 jumped to $.50$ ($p = .00$). Among the situational variables, the most powerful predictor of supervisors' perceptions of subsequent work performance was their rating of work performance at the time the employee was defined as a problem ($\beta = .63$, $p = .00$). Whether or not the alcoholism policy was applicable also was a significant, but not so powerful ($\beta = .16$, $p = .00$) positive predictor. Behaviors indicating

poor social adjustment and the time elapsed between the incident and the interview were significant negative predictors.

Discussion

Two factors likely to affect the use and effectiveness of discipline differed in this study from most earlier studies. First, this research was conducted in field settings and focused on actual behaviors. Second, it specifically assessed the use and effects of discipline, and only for employees who were chosen by their supervisors as "a difficult problem." Under these circumstances, 95 percent of the supervisors reported using informal discipline, and almost half used formal discipline. Because these actions were taken to deal with employees considered difficult problems, the findings can be generalized to the treatment of other employees in this company only when and if they become defined by their supervisors as difficult problems. It also is clear from these findings, however, that most supervisors sometimes encounter situations in which they consider behaviors of some subordinates enough of a disruption to take disciplinary action.

Use of Discipline

There was scant evidence in the results that supervisors in this company use discipline because of certain personal tendencies, or to discriminate against certain types of employees. Instead, the results indicated that supervisors use discipline primarily as a response to certain behaviors and when their work context is relatively favorable to its use and supportive of their supervisory role.

These results are consistent with those of Edwards and Scullion (1982), who also studied the use of discipline in natural settings, but used qualitative methods. Like theirs, our results suggest that managers are constrained by the specific situation, by policy, and by the general organizational context in using discipline. In particular, they found that strong unions made it possible for workers to successfully resist formal management controls (Edwards & Scullion, 1982). In the U.S. company studied here, union influence was negatively related to the use of confrontive topics and suspensions, but not to the use of written warnings, possible involuntary separations, and discharges. In addition, results for authority and informal influence are consistent with Edwards and Scullion's (1982) general conclusion that when supervisors are less powerful, they are less likely to use discipline. Supervisors with less authority and informal influence in decision making less often used confrontive topics and suspensions. It is noteworthy that those who rated themselves high on informal influence used an informal form of discipline—confrontive topics—significantly more, and those who rated themselves high on formal authority used significantly more of both informal and formal means of discipline.

These results suggest that being relatively powerful permits or encourages supervisors to use discipline. They thus call into question Kipnis' (1976) conclusion that powerholders are more likely to use sanctions when their expectations of successful influence are low. The present results can be reconciled with Kipnis' theory, however, if it can be assumed that supervisors' expectations of successful influence vary on a case-by-case basis, and thus are very responsive to factors called the "immediate situation." The data obtained are consistent with such an interpretation.

Results obtained for spans of control in this study also may be helpful in modifying and clarifying results of past research. As in earlier research (Goodstadt & Kipnis, 1970), supervising a large work group permits or encourages supervisors in the company to use the milder forms of discipline. Spans of control are relatively large; a span of 30 to 35 was not unusual on the production floors. One advantage that supervisors have in managing such a large number of subordinates is that it is unlikely that subordinates can form a single, cohesive, informal group. Thus, large spans of control make it more difficult for workers to constrain their supervisors through informal work group controls, which frequently are used to protect poor-performing members (Goode, 1973). Large spans of control also could facilitate the use of discipline because supervisors are more socially distant from workers, with whom they cannot frequently interact (Goffman, 1963). Podsakoff (1982) suggested that large spans of control encourage the use of punishment because supervisors do not have time to correct behavior by other means. The results of the present study show that supervisors with large spans do find time to discuss deficient performance with their subordinates in both a constructive and a confrontive way.

Type of location also was significantly related to the use of discipline. Supervisors in installation (the missing category for the location dummy variables)—in which supervisors and subordinates work together in relatively small groups in the field, often in locations distant from their homes—less often used discipline. Supervisors in the other two, larger types of locations—in which social situations contributed to less cohesive work groups and more social distance between supervisors and subordinates—more often used discipline.

Expectancy and learning theories suggest that people are more likely to take actions and repeat behaviors that they expect to be rewarded than those that they expect to be punished. Supervisors' expectations relative to their possible use of the company's alcoholism policy were assessed because the policy includes prominent disciplinary provisions. Although these expectations produced only scattered relationships with the use of discipline, the results had a kernel of internal consistency, suggesting that supervisors who expected rewards from using the alcoholism policy tended to be rather punitive compared to other supervisors. Those who expected generally positive outcomes apparently associated their expectations with the punitive aspects, because they tended to use fewer constructive topics than did other supervisors. Those who expected their use of the policy to please their supervisors

and impress upper management had greater numbers of subordinates who left the company or were discharged. Apparently these supervisors believed that upper management preferred simply to get rid of problem employees.

In a general way, results for the situational variables are reassuring. Supervisors most often use discipline when they consider employees' behaviors a relatively serious and disruptive problem and the employee has relatively poor and deteriorating work performance—including absenteeism, unexplained disappearances, changes in physical appearance, and the apparent inability to work effectively. Because employees in work organizations are expected to perform satisfactorily in exchange for the financial remunerations they receive, these are situations for which general social norms say that the use of discipline is justified. These results also are consistent with those of many other studies (Podsakoff, 1982).

Also, it is clear from these results that supervisors are more likely to use discipline when company policy encourages it. This company has an extensive policy specifying how and when to administer various types of discipline to employees suspected of having drinking problems, but it has only a brief and rather vague policy statement dealing with the grossest forms of other deviant behaviors: stealing, physical assault, sexual harassment, and so on. However, the company did have a separate policy to deal with absenteeism that included the possibility of discharge. Neither of the other policies fully incorporated all of the types of progressive discipline embodied in the alcoholism policy, although more of the elements were present in the policy on absenteeism than in the policy on deviant behaviors. The explicit alcoholism policy statement encouraged the use of discipline not only by telling supervisors what to do and presumably making them accountable for it (Kipnis, 1976), but also by legitimizing their actions to other subordinates, their peers, their superiors, and themselves.

Finally, although they were less consistently associated with the use of discipline, several personal and interaction characteristics produced more than one significant relationship. Results show some differential treatment of employees by personal characteristics. Stoeberl and Schniederjans (1981) concluded that tenure plays a key role in the retention of ineffective employees. Data in the present study, however, do not support this conclusion. Although younger employees experienced more confrontive topics, it was the older employees who were more often suspended or left the company. But the data do lend some support to the contention that women tend to be protected and treated chivalrously (Beyer & Trice, 1981b; Kanter, 1977; Pence et al., 1982; Reckless & Kay, 1967). Women were less often suspended or discharged in this company. Also consistent with previous research (Rosen & Jerdee, 1974; Trice & Beyer, 1977), higher status (i.e., professional or managerial) employees were less often given written warnings and suspensions. Of the supervisor characteristics studied, only the ideology of social responsibility was related to the use of discipline. Supervisors who felt that employers should help employees and be socially responsible used more days suspended, and their problem employees more often left the company.

Apparently these supervisors carried progressive discipline to the point of long suspensions, but then allowed problem subordinates to save face and leave the company "voluntarily." This company has a very liberal retirement package, and this alternative could be attractive to long term employees and their supervisors who wanted to be kind. One interaction characteristic also was significantly related to the use of discipline. When supervisors were more similar in age to their subordinates, they more frequently used confrontive topics and written warnings. Perhaps they felt they had to use discipline to overcome their similarity and to establish their authority over subordinates close to their own age.

Effects of Discipline

For the purposes of this research, the effects of discipline were assessed by supervisory reports of the disciplined employees' subsequent work performance. Not only are supervisors usually in the best position to assess subordinates' performance, but in important ways subordinates' performance is what the involved supervisors say it is. This is especially true for employees defined, as they were in this research, as disruptive and "serious problems." A perceptive baseball umpire observed that pitches "ain't nothing 'till I call them" (Weick, 1979, p. 5). In workplaces, whether supervisors define behavior as acceptable or unacceptable has almost as potent practical consequences.

Unlike many earlier studies, the effects of discipline on subsequent work performance were assessed without and with controls for many other factors. In the findings without controls, some forms of discipline—constructive topics and being suspended—had positive effects. Other forms—confrontive topics, written warnings, and the number of days suspended—had negative effects. In analyses controlling for initial work performance, all but confrontive topics remained significantly related to subsequent work performance. Even with all of the independent variables used to predict use of discipline controlled, four of the six forms of discipline were significantly related to work performance. In both analyses with controls, the use of discipline accounted for relatively modest, but significant portions of the variance in subsequent work performance of target employees.

In some respects, these results support opinions often voiced in the HR and IR literature that, if it must be used, mild discipline is most effective. Arvey and Ivancevich also proposed that punishment of "moderate intensity levels may be most functional" (1980, p. 127). In this company, the use of constructive topics in informal discussions had positive effects on subsequent performance. Suspending employees also had positive effects, but repeated and longer suspensions had negative effects. In other respects, the findings support arguments made by advocates of organizational behavior and modification (Connellan, 1978; Luthans & Kreitner, 1975; Megginson, 1977) that the use of negative sanctions is often ineffective, and even harmful.

More severe forms of discipline—written warnings and longer suspensions—were negatively related to the disciplined employees' later work performance. Also, employees' leaving the company, whether reported as voluntary or a discharge, was negatively associated with their work performance at the time of separation.

But the most striking finding from these analyses is the high degree to which situational and contextual factors were important in predicting employees' performance following discipline. By comparison, the characteristics of employees, supervisors, their interactions, and the discipline used had relatively small effects. Apparently not only is supervisors' use of discipline encouraged or constrained by factors in the work setting, but the effects of discipline on the target employees' subsequent work performance also are powerfully constrained by these factors. Because the positive rather than the negative effects of discipline were especially attenuated when the situational and contextual variables were controlled, it appears from these results that positive effects of discipline on the target employee's subsequent performance tend to be dependent on and thus partially products of the context in which discipline occurs. In this study, for example, the presence of an applicable policy supporting and legitimizing the use of discipline with employees seen as alcoholic was an important feature of the context in which discipline was used. These employees, in turn, improved significantly more than did other problem employees—who had been rated as equally disruptive and poor performers. It is unlikely that these differences are attributable to alcoholics' being easier to influence or to their greater likelihood of improving spontaneously. Before the advent of applicable company policies, alcoholic employees were notoriously resistant to supervisory interventions and often had to be fired for cause (Henderson & Straus, 1952). Thus it is reasonable to conclude that the presence of an applicable policy provided a context that made improvements in work performance more likely. Unfortunately, the negative effects of discipline appear to be less dependent on context and, in that sense, more universal.

Although the results of this study failed to show independent positive effects of formal discipline on target employees' performance, the use of such discipline probably has other positive effects that justify and support its use. As O'Reilly and Weitz (1980) found, work-group performance can be positively affected when supervisors use discipline because its use serves both to uphold norms and to make the possibility of negative sanctions more salient among other subordinates. In addition, one supervisor's use of discipline may be the occasion of vicarious learning (Manz & Sims, 1981) by other supervisors.

Conclusions

The use of discipline is a fact of life in work organizations. IR and HR researchers recognize this, but unfortunately they have tended to focus too exclusively on the effects of discharge. Organizational researchers have more often been guilty of ignoring the reality that discipline is used; they need

to incorporate an explicit consideration of discipline into their theories and empirical research.

Given the dearth of prior data on the relationships of these factors to the use and effects of discipline and the limitation of this study to a single company, results obviously are not definitive. Perhaps they have provided a useful start for more comprehensive investigations of the use and effects of discipline in natural organizational settings. Such investigations are sorely needed.

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Leadership: It Can Make a Difference

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The effects of leadership on organizational performance were investigated in a longitudinal study. Effective leadership was found to be associated with improved organizational performance. Furthermore, these leaders were effective in more than a single organizational unit. Succession in and of itself was not related either to performance disruption or to improved performance.

For many years the assumption that leaders influenced organizational performance went unchallenged. Theorists approached the study of leadership assuming that leaders contributed significantly to organizational effectiveness. Consequently, the leadership literature focused on such issues as identifying the traits or characteristics of leaders, the appropriate style(s) or behavior(s) for leadership, or the development of leadership skills. No one asked, "Does leadership make a difference?"

Recently this basic assumption has been examined (House & Baetz, 1979; Johns, 1983; Pfeffer, 1977), and the emerging answer has been something less than definitive. In one of the few studies to consider this assumption directly, Lieberman and O'Connor (1972) compared the impact of leadership effects to the impact of environmental and organizational influences in 167 corporations. From their longitudinal analysis they concluded that more variance in organizational performance can be attributed to environmental factors than to those persons in top leadership roles. Also, using multiple criteria and a similar methodology, Salancik and Pfeffer (1977) estimated the impact that mayors had on city governments. Finding that popular folklore has overestimated the influence of mayors and that "changes from mayor to mayor are minor," they pessimistically concluded that changes in leadership are not likely to bring about major changes in such organizations.

In considering the assumption that leadership is causally related to organizational performance, Pfeffer (1977) argues that it is not surprising that leadership should have little observable effect on organizational performance. First, the selection process for managers or for those chosen for leadership

positions results in a homogeneous group of persons promoted. Second, leaders are part of a social system that constrains behavior by defining and limiting the range of possible action. Finally, forces external to the leader's control may substantially effect organizational outcomes, thereby limiting or diluting a leader's impact on organizational performance.

House and Baetz (1979) briefly review the literature on leadership effects and disagree with Pfeffer's position. They conclude that leadership can account for significant amounts of variance in a variety of criterion measures, particularly if the parameters that moderate the relationship between leader actions and outcome variables are considered. Much of the research they cite, however, concerns employee satisfaction (Maier, 1970), subordinate productivity (Wexley, Singh, & Yukl, 1973), or was conducted in laboratory settings (Shaw & Blum, 1966). With the exception of the Meyer (1975) and Lieberman and O'Connor (1972) studies, there is little evidence from their review that addresses the issue of organizational performance. Consequently, they do little to resolve the issue.

The House and Baetz (1979) viewpoint is not unique; support also comes from other sources. In a reanalysis of the Lieberman and O'Connor (1972) data as well as an examination of 193 manufacturing organizations over a 19-year period, Weiner and Mahoney (1981) found that leadership did account for more variance in organizational performance than did many environmental or organizational factors. In part, they attribute the differences between their findings and Lieberman and O'Connor's results to the level of specificity of criterion measures and statistical procedures used. Thus, as with many issues in the social sciences, the choice of methodology seems crucial.

In order to judge the impact of leaders on performance, the first obvious methodological requirement is that change must occur: leaders must be replaced. In the field of organizational theory, this requirement also is shared by the studies on leadership succession. Although the managerial succession research is concerned primarily with understanding the consequences of succession on performance (Allen, Panian, & Lotz, 1979) or with the relationship of leadership change to environmental or organizational factors (Helmich, 1978), many such studies can be evaluated from the perspective of leadership contributions to organizational outcomes. Eitzen and Yetman's (1972) study of basketball coaches appears to share Gamson and Scotch's (1964) conclusion that coaching changes make no initial difference in team performance, a viewpoint that supports the position that leaders have little impact on outcomes. Such a conclusion should be considered cautiously. Eitzen and Yetman's data also indicate that unsuccessful teams experience more change. Thus, they speculate that the coach who remains at a school may be more successful, that is, he may make a positive difference in his team's record. Coaches failing to produce a winner are replaced.

Considering the studies just reviewed, one not only agrees with Pfeffer (1981) that there is a paucity of empirical evidence but also realizes that

the issue cannot be resolved from this limited informational base. Furthermore, alternative designs and methodologies must be employed before the impact of organizational leadership on performance can be accurately assessed. Much of the research to date has at least implicitly assumed that those in leadership roles are a homogeneous group. The possibility that some individuals might possess superior leadership skills or have a style of behavior more appropriate for a particular organizational environment has seldom been considered. No attempt has been made to distinguish the impact of outstanding or superior leaders from others in leadership roles. Furthermore, even if one were able to distinguish those persons with outstanding leadership skills, the results would be confounded with the characteristics of that particular organizational unit. Past research on mayors, managers, coaches, and chief executive officers has not had the opportunity to consider a particular individual's performance in more than one setting or organization. The Billy Martins of baseball, who are afforded the opportunity to direct several different teams, are rare individuals.

The present study permitted a test of the authors' hypotheses concerning leadership and organizational performance as well as addition to the empirical data on leadership effectiveness. Using a longitudinal analysis, the careers of senior United Methodist ministers were studied over a 20-year period. These data presented a unique opportunity. First, quantifiable information on each organization's (church's) performance was available and could be compared to the performance of other similar organizational units. Second, it was possible to use this information to identify outstanding performance by an individual minister in one organization and to determine if the leader could achieve similar results in other units. The United Methodist Church has a historic policy of regular reassignment of ministers (on the average of every five years). Thus, replacement of the leader is somewhat independent of his/her performance or the organization's performance. Finally, this policy of regular reassignment permitted an investigation of the related issue of organizational succession and performance.

To summarize, *it was hypothesized that effective leaders do have an impact on organizational performance.* However, it first is necessary to differentiate effective leaders from those who simply fulfill leadership roles. The second hypothesis focused on the issue of leadership succession and performance. *It was predicted that in a stable environment there should be no performance change attributable to a succession event alone.*

Method

Sample

The sample consisted of 50 ministers of the Northeast Ohio (NEO) Conference of the United Methodist Church. This sample was taken from a list of all ministers ($N=223$) who were currently full time, credentialed pastors and eligible to be appointed to any church in the Conference. This list was

then restricted to only those ministers who in 1970 had from 10-20 years tenure as ministers. Thus, each minister would have been employed in 1960 and would have been eligible for service until at least 1980. This final list ($N=110$) was used to obtain a stratified random sample of 50 ministers, stratified by length of tenure. For example, if the list contained 11 ministers with 15 years of tenure (constituting 10 percent of the total), then 10 percent of the sample should also have 15 years of experience. As previously noted, the United Methodist ministers are transferred regularly. For this final sample of 50 ministers, the mean number of churches served by each minister was 3.68 ($SD=1.077$) over the 20-year period. In other words, these ministers were transferred every $5\frac{1}{2}$ years on the average.

Data for this sample of 50 ministers were collected for a 20-year period, 1961 to 1980. These data were obtained from the annual NEO Conference reports. For each of the 20 years, the specific church congregations associated with each of the ministers were identified and objective measures of organizational performance concerning both financial and membership affairs for each church were recorded.

Variables

The variables coded for each church and subsequently used in the analysis are as follows:

1. Attendance—the average weekly attendance at the morning worship service for the year.
2. Membership—the total number of individuals on the membership rolls of the congregation at the end of the year.
3. Property value—the dollar value of church owned land, buildings (including the parsonage), furnishings, and equipment at the end of the year.
4. General Assembly giving—the Conference apportions to each church a specific amount of money that it is expected to give to support the church at the national level. This variable is recorded as the difference (positive or negative) between what is apportioned for a given year and what was actually given.
5. Total giving—the total charitable income of the church for the year.
6. United Methodist Women (UMW) giving—the amount of income of the UMW for the year. UMW is an auxiliary group connected with each church but governed and operated independently of the minister's leadership.
7. Salary—the salary paid to the minister of interest for the year.

The first five variables are stable objective measures of a congregation's overall performance. Expectations were that the minister (leader) would be able to impact positively or negatively on these variables during his/her tenure with the congregation. A more effective leader would be associated with increases in each of these variables, whereas other leaders would be associated with insignificant or negative changes. Of the objective measures available,

these variables were chosen for analysis because they reflect total congregational performance and should be responsive to the direct involvement and programmatic efforts of the leader. Variables that measure involvement in a single church program (e.g., Sunday School attendance) or charismatic behavior and dramatic events (e.g., new converts or number received on profession of faith) were not used. Measures of overall organizational performance provided clearer answers to the question of leadership and organizational effectiveness. The sixth variable, UMW giving, was included for analysis because it was anticipated that the minister should have no impact on this variable. A minister does not provide leadership, attend UMW meetings, serve on its nomination committee, or participate in any way with this group. (For the sample, the most likely involvement was to deliver the devotional at the Christmas spouses' dinner.) Thus the minister has little opportunity to influence UMW giving. If organizational behavioral changes are attributed to effective leadership, then these changes should occur only in those areas that the leader influences and not in auxiliary groups; however, if organizational changes occur because of historical events or for some reason outside the minister's control, these changes should occur in all areas, not just those that he/she directly influences. The inclusion of UMW giving in the analyses was to provide a contrast between those areas under the leader's influence and those outside his/her domain.

These six variables were then transformed in order to allow comparisons across churches and across years. First, all monetary variables were adjusted for inflation by using the cost-of-living adjustment (COLA) index provided by the United States Bureau of Labor Statistics. This adjusts all figures to be equivalent in terms of 1967 dollars. Second, the variables were standardized within year (across churches) by converting to *z*-scores. This last transformation was necessary to allow churches with quite dissimilar characteristics to be compared on an equivalent basis. This procedure permits all the variables to be compared across years and across churches.

Results

Impact of Effective Leaders

The procedure involved two phases, the identification of effective leaders and then an estimation of the leader's impact on organizational performance. The salary paid to a minister was used to identify effective leaders. Ministerial salaries are determined by each congregation. Salary increases offer the membership an opportunity to recognize outstanding performance. If the church is financially unable to reward superior performance, the minister's supervisor may arrange a transfer to a more financially rewarding post. Thus, the salary a minister receives can be treated as an objective performance appraisal measure.

To identify ministers who were receiving the highest salaries consistently across their careers, the salary figures were first regressed onto tenure (time

since becoming a full time, nonprobationary minister). Having removed the salary variance due to tenure, the residual salary figures were standardized within year through a z-transformation. Ministers were identified who, for the entire 20-year period, consistently had tenure-adjusted standardized salaries above the mean, and in addition had salaries at or above one standard deviation above the mean eight or more times. This criterion resulted in 7 of the 50 being labeled as high performing ministers.

The second phase of the analysis was concerned with testing the hypothesis that the high performance leaders should have a greater, positive effect on church performance variables than the average or low performing leaders. This hypothesis was tested using regression analysis. Each period of association between a specific minister and a specific church was identified as one unit of analysis. This resulted in 132 separate units. For each performance variable, the value for the last year of the minister's association with a church was regressed onto the value for the beginning year of the minister-church association. To determine if leadership would add to the predictability of the final year variable over and above the beginning year variable, a second dependent variable, minister performance level (coded 1 for high performing minister, zero otherwise), was entered into the regression equation. At the outset, it had been hypothesized that this status variable should add to the predictability of the first five performance variables because the minister should have an opportunity to have a positive, neutral, or negative effect on them. The status variable should not impact on UMW giving, however, as this activity is largely outside the purview of the minister's direct influence.

The results of this analysis are summarized in Table 1. A stepwise regression analysis was conducted separately for each of the performance variables. In each case, the first year performance variables were entered first into the equation and were all highly significant predictors of church performance in the minister's final year. This is expected. Clearly, organizational performance in such a stable environment as a church will not vary erratically from year to year. However, in spite of the large amount of variance accounted for by prior performance, the minister performance status variable added significantly to the prediction for all variables except UMW giving, as predicted. For instance, the status variable added to the prediction of church attendance, increasing R^2 from .701 to .736. Similar patterns of results were obtained for the other variables. These results demonstrate that identification and separation of effective leaders from all others produces a significant increment in explained variance in organizational performance.

Also, to determine if the variables required correction for serial correlation, the Durbin-Watson (D-W) statistic, a test for the statistical independence (or lack of it) of time-series data, was calculated (Durbin & Watson, 1951). All the values exceed the critical point (1.58) at $\alpha = .01$, indicating that serial correlation does not exist in the data used and thus no correction for autocorrelation was needed.

Table 1
Regression Results for Leadership Effect
on Organizational Performance

<i>Ending Value</i>		<i>Beta Weight</i>	<i>R^{2a}</i>	<i>Stepwise F</i>	<i>Prob > F</i>	<i>D-W^b</i>
Attendance	Beginning value	.629	.701	153.31	.0001	2.029
	Status	.531	.736	14.66	.0002	
Membership	Beginning value	.644	.849	396.43	.0001	2.366
	Status	.215	.854	4.30	.0401	
Property value	Beginning value	.644	.758	246.06	.0001	2.041
	Status	.284	.769	6.18	.0142	
Operating budget	Beginning value	.481	.263	51.08	.0001	2.365
	Status	.441	.289	4.68	.0324	
Total giving	Beginning value	.517	.600	103.30	.0001	1.821
	Status	.299	.611	3.74	.0555	
UMW giving	Beginning value	.418	.298	55.22	.0001	1.873
	Status	.240	.306	—	.2167	

^aThe value for status is the R^2 value when both variables are entered in the model.

^bDurbin-Watson statistic.

A graphical analysis of the data also indicated that the effective ministers had a positive impact on performance. The attendance and giving values were subjected to a Box-Jenkins ARIMA time-series analysis (Box & Jenkins, 1976). All churches were matched by the year in which the original 50 ministers appeared. A visual analysis of the resulting plots indicated that the performance for the churches with effective ministers improved when these ministers took charge and that these churches consistently performed higher than the others. Although such an analysis was not appropriate for this data set because of the relatively small number (20) of time points (McCain & McCleary, 1979), the results were consistent with the major analyses.

Impact of Succession Events

Succession, in and of itself, has been thought to lead to a disruption in organizational performance (Grusky, 1960, 1963). One method to test for this effect is to use regression analysis to see if the succession event is predictive of organizational performance following succession. The present data set is well-suited for this test because of the sheer number of succession events that occurred. It was hypothesized that there would be no disruption or improvement in organizational performance attributable merely to change in ministers. The first analysis tested for an immediate effect by looking for change over contiguous years; a second analysis tested for the succession effect over a 4-year time span.

To examine for an immediate change in performance attributable to succession, each of the five performance variables was compared for all possible pairs of contiguous years and for the original 50 churches over the 20-year period. For instance, membership for church X in 1961 was paired with membership for church X in 1962; 1962 with 1963, and on through 1979-1980. This was done for each church and for each of the variables.

Additionally, for each pair of data, a succession variable was created that was coded 1 if there was a change in minister between the two years (succession) and 0 if there was no change. A succession event occurred during approximately 20 percent of these pairs of years. A simple linear regression then was performed for each of the five variables with the dependent variable being the second year's performance and the independent variables being the first year's performance and the dummy coded succession variable. If succession is not a significant predictor, then it can be concluded that a succession event is not disruptive, either positively or negatively, in and of itself.

To test for a delayed succession effect, three 4-year time periods (1964-1967, 1969-1972, 1974-1977) were examined. (The entire period could not be used because all churches experienced several leadership changes during the 20-year period; and the analysis required a contrast between churches experiencing a succession event and churches whose leadership did not change.) These time periods not only represent early, middle, and late portions of the data, but they also satisfy the requirement for an adequate number of churches in the succession group as well as in the nonsuccession group. Thus, in each of these time periods, churches were identified that experienced no change in leadership (20 for the first period, 22 for the second, 17 for the third). For these churches, the five performance variables were paired for the years 1964 and 1967, 1969 and 1972, and 1974 and 1977. For the remaining churches, those that did experience succession during that time frame, the performance data for the year immediately following succession were paired with the data from the fourth year from that point. A regression analysis was conducted on the paired data, regressing the later year's performance onto the first year's performance and a dummy coded succession variable. As before, if the succession variable does not add significant predictability, it is concluded that it has no disrupting influence. This analysis was conducted on each of the five performance variables for each of the three time segments except for attendance in the early period, which had excessive missing data.

As hypothesized, the succession variable in both the test for immediate and the test for delayed succession effects did not add significantly to the

Table 2
Regression Results for an Immediate Succession Effect

<i>Variable</i>		<i>Beta Weight</i>	<i>R</i> ²	<i>F</i>	<i>P</i>
Attendance	Beginning value	.925	.89	5302.04	.0001
	Succession	-.054	.89	2.97	.0853
Membership	Beginning value	.889	.92	9861.50	.0001
	Succession	-.013	.92	.16	.6855
Property value	Beginning value	.628	.44	651.71	.0001
	Succession	.055	.44	.29	.5898
Operating budget	Beginning value	.681	.48	769.18	.0001
	Succession	.103	.48	1.24	.2656
Total giving	Beginning value	.768	.65	1557.51	.0001
	Succession	-.057	.66	.58	.4467

predictability of the later year's performance variable. For the first analysis, which examined an immediate succession effect for contiguous pairs of data, the beginning values of each performance variable were highly significant predictors of the ending values ($p < .0001$ in all cases), but the succession variable did not contribute significantly ($p > .05$ in all cases). (See Table 2.) The results for the delayed succession effect over a 4-year time span yielded virtually identical results. In no case is the succession variable a significant predictor of the later year's performance. (See Table 3.) Thus, leadership change or succession does not in and of itself account for either immediate or delayed variation in organizational performance, positive or negative.

Discussion

The results of these analyses bring some clarity to the issue of leadership effects on organizational performance. If ministers are viewed as a homogeneous group, each possessing similar leadership skills, then leadership appears to have little or no detectable influence on organizational outcomes. When the effects of leadership without distinguishing between superior and all other performers were examined, such events did not account for significant incremental variance in organizational performance. On the other hand, when this assumption was abandoned and effective leaders were differentiated from all others, leadership definitely made a difference. The group of superior performers demonstrated their impact, not only on a single criterion measure and within a single organizational unit, but also on multiple criterion measures and across several organizational units. Churches that superior performers led repeatedly experienced greater giving, membership growth, and property development than did other churches.

Not only do these results represent a statistically significant finding, but the greater effectiveness of these leaders also may have some practical relevance. As previously stated, in such a stable environment much of the variance is accounted for by past performance; however, outstanding performers do impact on their organizations. Evidence for such a position comes from an examination of the zero-order correlations of the last year's performance values and the status variable. They are .614, .635, .572, .084, and .547 for the variables attendance, membership, property value, operating budget, and total giving, respectively. All except the correlation with operating budget are highly significant, indicating that effective leadership is strongly associated with organizational performance. The low correlation with operating budget is anticipated because of the small amount of variance accounted for in the original regression analysis ($R^2 = .289$).

To date, both the leadership performance and succession literatures have been unable to separate leader influences from contingent organizational factors. Seldom do researchers have the opportunity to follow leaders as they direct several organizations or organizational units in the course of their careers. Usually, researchers must examine leadership in a single organization or one organizational unit. In this study, leaders could be traced

as they moved from organizational unit to organizational unit. This permits greater understanding of the contributions of the leader to organizational success.

Although these ministers were repeatedly associated with improved organizational performance, several caveats should be kept in mind. This analysis identifies a group of leaders that impact upon their organization, but the "great man" theory of leadership is not inferred or resurrected here. These individuals were effective in several churches, but it cannot be assumed that they would have been successful as business or military leaders. The churches certainly were similar in organizational structure and leader role expectations. The present findings are contingent on a specific type of organization and organizational structure. Furthermore, the analysis permits identification of highly effective leaders; it does not explain why. One can only describe them as effective and point out that, unlike other leaders, these ministers were effective across their careers in more than one organizational unit.

If one were to speculate as to why some leaders were more effective than others, several possible explanations seem reasonable. Because leadership effectiveness is demonstrated across several organizational units, it would appear that the cause may lie in some intrinsic attributes or characteristics of the individual. Examples of such attributes and/or characteristics could be personality characteristics, leadership style, and management ability. A second potential explanation is that these leaders were labelled as highly effective by the church hierarchy, and the churches to which they transferred may have been expecting superior leadership. The churches then may have acted to reinforce that expectation. A third possible explanation is that those who had previously been described as outstanding might have greater negotiating room with a congregation and could negotiate more role latitude, thereby permitting them to be more creative in their ministries. One or several of these explanations may be appealing, but the present analysis cannot provide direct tests of these hypotheses. The analysis permits only the identification of effective/ineffective leaders; one can only speculate as to why this occurs.

These findings also provide some insight into the leadership succession discussion. The study supports Gamson and Scotch's (1964) null effect position on succession. An examination of organizational performance for the total sample of churches shows that changes in leadership do not disrupt organizational performance or lead to immediate improvements as such research has suggested. However, sports writers, fans, and stockholders might be correct in calling for new leadership when an organization is floundering. If a change is likely to make no difference or at least will not harm the organization and there exists the possibility that the occasional exceptional leader might occupy that leadership position, why not change? Some leaders will influence organizational outcomes.

Can leadership make a difference? Some leaders definitely do influence organizational performance. Perhaps it is time to go beyond describing leader

activities or behaviors and concentrate on identifying effective or influential behaviors.

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An Investigation of Sex Differences in Pay Expectations and Their Possible Causes¹

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Discrepancies in the pay expectations of male and female management students were investigated, and potential causes of such discrepancies were explored. Females were found to have significantly lower career-entry and career peak pay expectations than males. Sex differences in career paths, comparison standards, and job facet importance were identified as potentially important explanations for these sex differences.

Full-time working women in the United States are concentrated in lower paying, lower prestige jobs than men, and they are paid less than men given comparable work and qualifications (Hoiberg, 1982; Levitan, Quinn, & Staines, 1971; Treiman & Hartmann, 1981). Despite this inequitable situation, however, most field studies of job and pay satisfaction have found no evidence that women are more dissatisfied than men with their pay or with their jobs (Crosby, 1982; Herzberg, Mausner, Peterson, & Capwell, 1957). Rather, the majority of studies find women and men to be equally satisfied with their jobs and their pay. Crosby (1982) has referred to this pattern of women being subjectively satisfied with their wages in spite of objective underpayment as "the paradox of the contented female worker."

A number of explanations have been offered for this paradox, the most popular being sex differences in reward expectations (Chesler & Goodman, 1976; Konar-Goldband, 1981; Major & Deaux, 1982; Nash & Carroll, 1975; Sauser & York, 1978; Smith, Kendall, & Hulin, 1969). Specifically, it has

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been suggested that women have lower pay expectations than men, hence their tendency to be equally as satisfied as men with lower pay (Smith et al., 1969) or more satisfied than men with equivalent pay (Sausser & York, 1978).

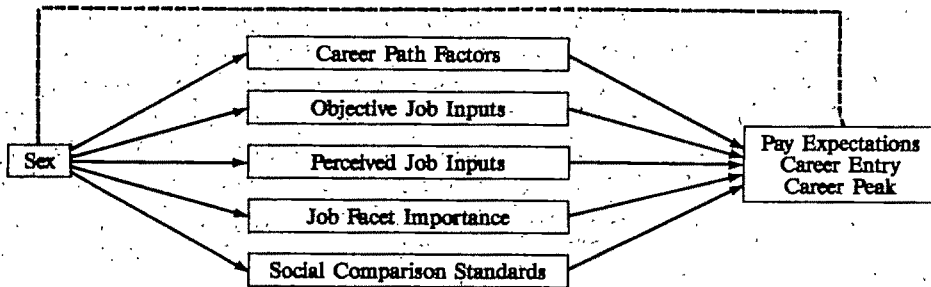
The idea that expectations are an important determinant of outcome satisfaction has been suggested by numerous theoretical perspectives (Adams, 1965; Crosby, 1976; Herzberg et al., 1957; Lawler, 1971, 1973; Locke, 1976; Porter & Lawler, 1968; Stouffer, Suchman, DeVinney, Star, & Williams, 1949). For example, Porter and Lawler (1968) suggest that job satisfaction depends on the match between expected and obtained rewards. Alternatively, Locke (1976) suggests that satisfaction depends on the discrepancy between what a person has received and what he/she desires, whereas Lawler (1971) suggests that satisfaction depends on the discrepancy between what a person has received and what the person feels he/she should receive. These theories have in common the notion that it is the discrepancy between perceptual-cognitive factors regarding what might be achieved and outcomes that are attained that fosters dissatisfaction. Thus, someone with low outcome expectations may be more satisfied with a given outcome than someone else with higher expectations might be with the same outcome. Results of numerous studies are consistent with this general proposition (Andrews & Henry, 1963; Ilgen, 1971; Spector, 1956).

Despite general support for the role that expectations play in influencing satisfaction, their use as an explanation for the lack of sex differences in job and pay satisfaction has been primarily post hoc. There is little direct evidence of sex differences in pay expectations. One exception is unpublished data cited by Nash and Carroll (1975) indicating that female undergraduates at the University of Maryland had much lower salary expectations after graduation than did males. Thus, the first purpose of the present study was to test directly the hypothesis that men and women differ in pay expectations. Male and female management students enrolled in an internship program prior to graduation were asked to indicate how much money they expected to earn at career entry and at career peak. It was hypothesized that women have lower career entry and career peak pay expectations than men, even among a highly selected group such as management students.

The second purpose of this research was to explore what factors might explain these possible sex differences in pay expectations. A review of the literature reveals that a number of factors have been hypothesized to contribute to, or determine, pay expectations. These include: career path factors (e.g., education; occupational choice); actual job inputs (e.g., effort, performance) and perceived job inputs (e.g., perceived effort, performance); actual and perceived job characteristics (e.g., difficulty, responsibility); perceived value of job outcomes (e.g., monetary and nonmonetary); and perceived inputs and outcomes of referent others (social comparisons) (Lawler, 1971, 1973; Porter & Lawler, 1968). Several of these factors may be particularly influential as determinants of possible sex differences in pay expectations. In particular, career paths and qualifications, comparison standards,

perceived job inputs, and the values placed on various job outcomes are all factors that may differ between men and women and may explain sex differences in pay expectations. Although prior research has not explored the predictive value of these factors for explaining sex differences in pay expectations, the literature provides some evidence regarding the plausibility of each. A simplified model that graphically portrays the hypothesized linkages can be found in Figure 1.

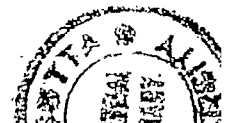
Figure 1
Hypothesized Model of Sex Differences in Pay Expectations



One explanation for sex differences in pay expectations and consequent satisfaction is that women and men select different *career paths*, with women pursuing less advanced degrees, planning to spend fewer years working full time, and self-selecting into lower paying occupations than men (Hoiberg, 1982; Treiman & Hartmann, 1981). Such differences in occupational and educational choices may lead to sex differences in pay expectations.

A second factor that may explain sex differences in pay expectations is that women and men may differ in their *objective job inputs*. That is, women's lower pay expectations relative to men may be based on the fact that women are less qualified than men or perform more poorly on the job than men. Although little evidence of this exists, the widely held stereotype that men are more competent than women, especially as managers (O'Leary, 1974; Schein, 1973) suggests the importance of examining this possibility.

A third set of factors that may mediate sex differences in pay expectations and satisfaction is that men and women may differ in the characteristic manner in which they *perceive their own job-related inputs* (Major & Deaux, 1982). In particular, women's perceptions of their job inputs may be lower than men's, thus leading to lower pay expectations among women. A substantial literature within social psychology has demonstrated that across a wide variety of tasks, women tend to have lower performance expectations than men and tend to devalue their own performance, in the absence of feedback, relative to men (Lenny, 1977). In addition, women and men have been found to differ in the explanations, or attributions, that they give to their performance (Deaux & Farris, 1977). Relative to men, women tend to use more external attributions for their successes and more internal



attributions for their failures. In turn, these explanations for performance have a significant impact on the perceived value and personal relevance of good or poor performance. Thus, sex differences in the characteristic way in which job inputs are perceived, particularly in terms of performance expectations, performance evaluations, and attributions for performance, may underlie sex differences in pay expectations.

A fourth factor that may mediate sex differences in pay expectations and satisfaction is the *value or importance that individuals place on various career job outcomes*, such as pay. Previous research indicates that the subjective value of job-related rewards may play an important role in job satisfaction (Landy & Trumbo, 1980). Several researchers have suggested that one reason why women are as satisfied as men with their pay, even though they earn less, is because money is not as important to women as it is to men; whereas other outcomes, such as good interpersonal relationships, are more important to women than to men (Callahan-Levy & Messé, 1979; Crosby, 1982; Sauser & York, 1978). Crosby (1982) has recently reported evidence consistent with this proposal, although other research has been less supportive (Brief, Rose, & Aldag, 1977; Jurgensen, 1978). The role that sex differences in job facet importance may play in explaining sex differences in pay expectations has not yet been investigated.

A fifth possible determinant of sex differences in reward expectations is the *social comparisons* that an individual makes. Social comparisons repeatedly have been found to be important mediators of expected pay and perceived fair pay (Adams, 1965; Goodman, 1974; Lawler, 1971). Chesler and Goodman (1976) have speculated that one reason why women continue to work for less money than men is because women and men may use different reference group comparisons; specifically, women may compare their outcomes with other women, rather than with those of men. Women typically are paid less than men, and thus they base their outcome expectations on, and evaluate the fairness of their outcomes against, a lower social comparison standard than do men. Recent research (Crosby, 1982; Major & Forcey, 1982) suggests that both sexes are more likely to compare with a same-sex rather than opposite-sex other when evaluating their jobs. Alternatively, women and men may use the same others for comparison, but estimate the pay of these others differently. Both of these approaches suggest that women and men differ in their estimates of the pay of others in their field, and that these differential comparisons underlie sex differences in pay expectations.

The present research was designed to assess the ability of the above five factors to explain any observed sex differences in pay expectations. Note that the goal of this research was not to identify and test the entire range of determinants of pay expectations. Rather, the goal was to identify and test those factors that, because of their relationship to both sex and pay expectations, could explain *sex differences* in pay expectations. Thus, the focus of this research was, first, to determine whether or not men and women

differ in their pay expectations and, second, to determine what factors might explain these sex differences in pay expectations.

Management students enrolled in a "work experience" internship were asked to respond to two questionnaires, one prior to the start of the internship and one at the completion of the internship. In addition, these interns' supervisors were asked to evaluate their performance on the internship. This allowed for the exploration of sex differences in pay expectations among a highly motivated, similarly trained group of men and women who did not yet have a long term professional pay history, but for whom ratings of relevant work performance could be obtained.

Method

Subjects

Of 83 students enrolled in the management internship program at the State University of New York at Buffalo during the spring semester of 1980, 61 responded to the first questionnaire, and 50 of these also responded to the second questionnaire. Thus the sample was comprised of 50 students, 31 male and 19 female; 64 percent (32) were enrolled in the MBA program, 6 percent (3) were enrolled in the joint BA/MBA program, and 30 percent (15) were business majors enrolled in the BA program.

Procedure and Measures

Via a mailed request, interns were asked to respond to two questionnaires regarding their perceptions of their internship and jobs in general. The first questionnaire was administered during the first few weeks of a five-month internship. This questionnaire addressed three factors proposed to mediate the relationship between sex and pay expectations; (1) *career path*—degree program (undergraduate business, combined BA/MBA, or MBA; coded 1, 2, and 3, respectively); specialty area (e.g., marketing, finance, personnel; recoded as personnel=1 and not personnel=0); and the number of years the person planned to work full time; (2) *expected job inputs* (how well the intern expected to perform on the internship; how hard the intern planned to work on the internship; and how strong the intern thought his/her background and training were for the work to be done on the internship—each coded on a 1 to 7 semantic-differential type scale); and (3) the *importance placed on different career job outcomes* (ratings of the importance of friendly and cooperative co-workers, friendly and cooperative supervisors, a high salary, good promotional opportunities, the chance to make important decisions, good job security, the interest of the work itself, frequent feedback about performance, high status, and the importance of the work itself—each rated on separate 1 to 7 scales, with 1 indicating not at all important and 7 indicating extremely important).

On completion of the internship, the second questionnaire was administered. This questionnaire assessed the critical measures of career entry and career peak *pay expectations*. Respondents were asked: "How much money do you expect to earn your first year working full time (in today's dollars)?" and "How much money do you expect to earn the year you make the most (in today's dollars)?" Career entry and career peak *comparison standards* were assessed via two questions: "How much money do you think most people in your field earn their first year working (based on today's starting salary)?" and "How much money do you think the best paid people in your field earn the year they make the most (in today's dollars)?" *Perceived job inputs* were assessed via interns' ratings of their overall performance on the internship, their strength of background and training for the internship, and the amount of effort they put into the internship, each rated on separate 1 (low) to 7 (high) scales. *Attributions* were measured by asking interns to rate on separate 1 (not at all) to 7 (to a great extent) scales the extent to which their most successful accomplishment on the internship was caused by luck, their ability, assistance of others, background and training, amount of effort, and ease of the work. It should be noted that although perceived job inputs (i.e., performance expectations, evaluations, and attributions) were assessed via questions addressed specifically to the internship job, it was felt that the responses to these questions might tap characteristic evaluative and attributional styles of women and men.

At the completion of the internship, each student's internship supervisor was asked to evaluate independently the student's *performance* on the internship and the strength of the intern's *background and training* for the job done on the internship on separate 1 to 7 scales. In addition, supervisors were asked to estimate what most people in the intern's field typically earn their first year working full time. These data provided independent assessments of the student's qualifications and performance, as well as independent assessments of typical career entry pay in the field.

Results

It was predicted that men's pay expectations would be significantly higher than those of women. The means and results of analyses of variance, presented at the top of Table 1, confirm this prediction. Males' expected career entry salaries were more than \$2,600, or about 16.5 percent, higher than were those of females. The gap between males' and females' career peak pay expectations was even greater. Men expected to be earning almost \$20,000 more than women expected to be earning the year they would earn the most, a difference of almost 46 percent.

Explaining Sex Differences in Pay Expectations

Five types of variables were proposed as possible explanations for the gap in male and female pay expectations. These were: career path factors

Table 1
Sex Differences in Pay Expectations and Hypothesized Mediators

	<i>Males</i>	<i>Females</i>	<i>F</i>
<i>Pay expectations</i>			
Career entry	\$ 18,516	\$15,895	6.66**
Career peak	\$ 61,482	\$42,188	12.73***
<i>Intern comparison standards</i>			3.52***
Others' career entry pay	\$ 17,942	\$15,722	4.17**
Others' top pay	\$236,315	\$69,588	2.95*
<i>Supervisor comparison standards</i>			
Typical career entry pay	\$ 14,850	14,342	<1
<i>Career job facet importance</i>			1.82**
High salary	5.32	4.16	10.19***
Interesting work	6.23	6.74	7.00**
Promotional opportunities	6.19	5.68	3.42*
Decision freedom	5.94	5.47	1.99
Frequent feedback	5.39	5.84	2.44
High status	4.71	4.16	1.78
Friendly co-workers	5.77	5.68	<1
Friendly supervisors	5.68	5.89	<1
Job security	5.10	5.32	<1
Important work	5.61	5.42	<1
<i>Perceived intern inputs</i>			
<i>Expectations</i>			<1 ^a
Background/training	5.32	5.21	<1
Effort planned	5.65	5.53	<1
Performance expectations	6.06	6.05	<1
<i>Evaluations</i>			<1 ^a
Background/training	4.93	4.53	<1
Effort put forth	5.37	5.21	<1
Performance evaluation	5.77	5.95	<1
<i>Attributions</i>			<1 ^a
Luck	1.90	1.74	<1
Ability	5.73	5.79	<1
Others	3.97	4.11	<1
Background	4.70	4.84	<1
Effort	5.60	5.74	<1
Task ease	2.83	3.21	<1
<i>Intern supervisors' ratings</i>			<1 ^a
Performance evaluation	6.17	6.41	1.09
Background/training	5.42	5.53	<1

^aThese are the multivariate *F* statistics for the variable cluster immediately following.

**p* < .10

***p* < .05

****p* < .01

(specialty area, selected degree program, years to work full time); comparison levels (perceptions of others' pay); the importance of various career job outcomes (money, interesting work, etc.); self-perceptions of job inputs (performance expectations, evaluations, and attributions); and objective job inputs. To examine the viability of each of these explanations, sex differences in each factor were assessed. Only those factors for which there was a significant ($p < .10$) sex difference merited further examination as plausible explanations for sex differences in pay expectations. The results of chi square analyses (for specialty area and degree program) and multivariate and univariate analyses of variance can be found in Tables 1 and 2. These analyses indicate that males and females differed on three major factors: career path, intern comparison standards, and career job facet importance.

Table 2
Career-Path Variables

	Males		Females		Difference
	Percent	(N)	Percent	(N)	
<i>Degree program</i>					$\chi^2(2)=5.53, p<.06$
M.B.A.	71.0	(22)	52.6	(10)	
Combined BA/MBA	9.7	(3)	0	(0)	
B.A. (Bus. Major)	19.4	(6)	47.4	(9)	
<i>Specialty area</i>					$\chi^2(4)=12.82, p<.05$
Personnel	9.7	(3)	52.6	(10)	
Marketing	38.7	(12)	26.3	(5)	
Finance/accounting	25.8	(8)	5.3	(1)	
Management information systems	9.7	(3)	10.5	(2)	
Other	16.1	(5)	5.3	(1)	
<i>Years planning to work full time</i>	35.6		31.7		$F(1,47)=2.05, p>.10$

As indicated in Table 2, although all subjects were management students, the career paths of males and females were not equivalent. Men were more likely than women to be MBA rather than BA candidates, although this difference was not significant. Differences in specialty area chosen were more dramatic; for example, over half the women, as compared to only 10 percent of the men, chose to concentrate in personnel. Women and men in this sample did not differ significantly in the number of years they planned to work full time.

Men and women also differed significantly in their career entry comparison standard. Men thought that others in their field earned approximately \$2,200 more at career entry than women thought others in their field earned. Women and men also differed marginally ($p<.10$) in their career peak comparison standards. Men thought that the best paid others in their field earned more than three times as much at career peak than women thought they earned. The standards provided by supervisors (who were managers in the interns' field), however, did not differ for male and female interns. That is, supervisors of males and females provided similar estimates of typical career entry pay. Thus, the sex difference in pay expectations does not appear to reflect supervisors' expectations or perceptions of pay levels in the field.

With respect to the importance placed on various career job outcomes, women and men differed significantly in the importance they placed on a high salary and interesting work. Men rated a high salary as significantly more important than women did, and women rated interesting work as significantly more important than men did. Men also rated promotional opportunities somewhat higher ($p<.10$) than women did.

Analyses of perceived job inputs revealed that women and men were virtually identical in their performance expectations, evaluations, and attributions for the internship job. Thus, the men and women in this sample did not display differences in the manner in which they perceived their job-related inputs. Furthermore, women and men did not differ in their objective job inputs, as rated by their supervisors. Thus, at least when assessed regarding

a specific job experience, these factors do not appear to be plausible explanations for the observed sex differences in pay expectations.

To examine the extent to which the factors demonstrating a sex difference could explain the observed sex difference in pay expectations, a hierarchical multiple regression analysis (i.e., one in which the entry order of variables is specified) was conducted using the 47 subjects for whom all data were complete. The bivariate correlations of the variables used in these analyses are presented in Table 3. It is important to note that the focus of the analysis differs from that of the typical regression analysis. The intent was *not* to predict a single dependent variable from multiple independent variables. Rather the focus here was to understand a relationship—that between sex and pay expectations. The intent was to examine the association of sex and pay expectancies as it exists and to examine the changes in that relationship as various possible underlying causes or processes were statistically controlled.

Table 3
Bivariate Correlations Among Variables in Regression Analysis
(*N* = 50)

Variable	Variable							
	1	2	3	4	5	6	7	8
1. Specialty area ^a	—							
2. Degree program	-.07	—						
3. Career entry comparison	-.22	.57***	—					
4. Career peak comparison	-.20	.15	.14	—				
5. Importance of high salary	-.18	.15	-.20	.19	—			
6. Importance of interesting work	.30*	.06	.02	.11	-.27*	—		
7. Career entry pay expectations	-.28*	.47***	.80***	.18	-.07	.03	—	
8. Career peak pay expectations	-.28*	.14	.21	.43**	.28*	-.10	.47***	—
9. Sex ^b	.48***	-.25*	-.29*	-.26*	-.42***	.36**	-.35***	-.49***

^a0 = not personnel, 1 = personnel.

^b1 = male, 2 = female.

* $p < .05$

** $p < .01$

*** $p < .001$

Because the partial and standard partial regression coefficients for a given variable in a regression equation (the *b* weights and beta weights, respectively) indicate the predictive utility (association) of that variable with the effects of the other variables in the equation held constant (Cohen & Cohen, 1975; Kerlinger, 1973), the regression coefficients for sex can be examined when it is the sole factor in a regression equation predicting pay expectations and when other factors are included. When sex is the only variable in the equation (see Table 4, step 1), the regression coefficients and the *F* statistic for sex indicate the degree and significance of the relationship.

between sex and pay expectancies. As other factors are successively included in calculating the regression equations (see Table 4, steps 2 through 5), the regression coefficients and *F* statistics for the sex factor reflect the relationship between sex and pay expectations controlling for these other factors.

More specifically, as illustrated in Table 4, the *b* weight for sex indicates the dollar value of the gap in pay expectations between men and women initially (step 1) and then controlling for the other factors (steps 2-5). The beta weight indicates the zero order correlation between sex and pay expectations (step 1) and the partial correlation between sex and pay expectations controlling for the other factors in the equation (steps 2-5). The *F* statistic reflects the significance of sex as a predictor of pay expectations initially (step 1) and then controlling for the hypothesized mediating factors (steps 2-5).

Table 4
Variance in Pay Expectations Associated with Sex
Controlling for Possible Explanatory Factors

Step	Variable Specified to Enter	β for Sex	Beta for Sex	<i>F</i> for Sex	Adjusted <i>R</i> ²
<i>Career entry pay expectations</i>					
1	Sex	-3,178	-.43	10.59**	.17
2	Degree program	-2,438	-.33	6.80**	.29
3	Specialty area*	-2,118	-.29	3.56	.28
4	Importance of job facets (pay and work interest)	-2,904	-.40	5.97*	.30
5	Comparison career entry pay	-1,523	-.21	3.12	.66
<i>Career peak pay expectations</i>					
1	Sex	-18,613	-.47	11.28**	.20
2	Degree program	-18,913	-.48	10.31**	.18
3	Specialty area*	-16,141	-.41	5.49*	.18
4	Importance of job facets (pay and work interest)	-15,198	-.39	4.18*	.15
5	Comparison top pay	-11,779	-.30	2.53	.21

*0=not personnel, 1=personnel.

**p* < .05

***p* < .01

As indicated in Table 4, the initial difference in career entry pay expectations between these 47 women and men was \$3,178, with sex accounting for about 18 percent (.43²) of the variance in pay expectations. The *F* (10.59, *p* < .002) indicates that sex is indeed a significant predictor of pay expectations. Subsequent regression equations (steps 2-5) indicate that the degree program differences could explain \$740 (\$3,178-\$2,438), and the specialty area differences could explain an additional \$320. Taking these career pay factors into account, however, did not eliminate the significant sex difference in pay expectations, as evidenced by the significant *F* for sex after these factors were entered into the equation. Thus, sex differences in pay expectations were not entirely explained by initial differences between men and women in their degree program or specialty area.

Investigation of the impact of subjective factors revealed that ratings given to the importance of pay and work interest (career job facet importance)

merely suppressed the sex difference. The estimate of others' career entry pay (comparison career entry pay), on the other hand, could explain \$1,381, or almost *half* of the \$3,178 difference between men's and women's career entry pay expectations. The beta weights reinforced the message of the *b* weights. Sex initially accounted for about 18 percent of the variance, of which only 4 percent was not also associated with differences in degree programs, specialty area, and comparison standards for career entry pay. Lastly, sex was a significant predictor of pay until the last step when comparison standards were held constant. At this point the *F* for sex dropped to marginal significance ($p < .09$), indicating that the sex difference in pay expectations would not be significant if all of these factors were controlled.

The findings for career peak pay expectations were generally similar except that the degree program did not explain any of the \$18,600 observed difference between men's and women's expectations. It may be that the BA students, who were more likely to be women, were planning to acquire an MBA before career peak. Specialty area still accounted for a sizable portion of the sex gap (\$2,772 or 15 percent); career job facet importance accounted for \$943 (5 percent); and comparison top pay accounted for an additional \$3,419 (about 28 percent). There remained, however, a difference of \$11,779 in career peak pay expectations of men and women that was not explained by these factors, a sizable but nonsignificant difference. The beta weights indicated that although sex initially accounted for 22 percent of the variance in career peak pay expectations, only 9 percent of that variance could not be explained by the factors considered. As with career entry expectations, when these factors were considered, sex itself was no longer a significant predictor of pay expectations.

Although not the central focus of this paper, one notes the degree to which the five factors of sex, degree program, specialty area, importance of pay and work interest, and comparison standards could account for the pay expectations of the group as a whole (both men and women). Examining the regression equation for career entry pay expectations, the multiple *R* was .85, the R^2 was .70, and the adjusted R^2 was .66, $F(6,41)=15.89$, $p < .001$. Thus, these five factors accounted for 70 percent (66 percent adjusting for number of factors) of the variance in career entry pay expectations of the management students in this sample. The findings for career peak pay expectations were not as strong, although the equation was significant, $F(6,34)=2.76$, $p < .03$. The multiple *R* was .57, the R^2 was .33, and the adjusted R^2 was .21, indicating that approximately one-fifth of the variance in career peak pay expectations could be explained by these five factors.

Discussion

This research demonstrated a substantial sex difference in career entry and career peak pay expectations among a highly selected sample of professional men and women. Men expected to earn approximately 16.5 percent more pay at career entry and 46 percent more pay at career peak than

did women, suggesting that the gap between men's and women's pay expectations not only exists at career entry, but may increase over the career span. This finding of sex differences in pay expectations is consistent with prior speculations (Sausser & York, 1978) that the failure to observe sex differences in pay satisfaction may be due to differences in pay expectations, although this link was not tested directly in this research. Specifically, the "paradox of the contented female worker" may be attributed in part to the tendency for women to expect less pay than men and thus be more likely to have their expectations fulfilled, even though they earn less.

The tendency for women to expect lower pay than men also may have important implications for their future pay in the workforce. Recent research (Major, Vanderslice, & McFarlin, *in press*) has demonstrated that job candidates with higher pay expectations are offered more money than equally qualified candidates with lower expectations. Thus, to the extent that pay expectations are instrumental in determining future pay, women's lower pay expectations may contribute to their underpayment relative to men in the workforce.

The search for factors that might explain sex differences in pay expectations pointed to the importance of both objective and subjective factors. Despite general similarity in the broad occupational choice of management, the career paths of the women and men in this sample differed in some important ways. First, the women in this sample were more likely than men to have chosen to specialize in personnel rather than in the higher paying fields of finance and marketing (Wright, 1982). In addition, the women were more prevalent in the undergraduate rather than the MBA program. These differences in career paths explained a sizable portion, although by no means all, of the differences between women's and men's career entry and career peak pay expectations. After these sex differences in career path factors were taken into account, a \$2,100 sex difference in pay expectations remained. Thus, controlling for initial career path factors reduces but does not eliminate the significant discrepancy in males' and females' pay expectations. Women and men did not differ in the number of years they planned to work full time or in their actual internship performance, as rated by their supervisors. This suggests that neither of these factors is a likely explanation of sex differences in pay expectations.

That significant sex differences in pay expectations remained once objective factors were statistically controlled suggests the importance of other explanatory factors. Specifically, subjective factors also were found to play a key role in explaining the pay expectations gap. Most interesting were the sizable sex differences observed in comparison pay estimates. Women think others in their field earn less than men think they do, and these comparisons were important predictors of sex differences in pay expectations. Differences in comparison standards explained almost half of the difference between men's and women's career entry pay expectations and accounted for more of the difference in career peak pay expectations than any other single factor. Significantly, supervisors of men and women did not differ in their

estimates of what they thought typical others in the intern's field would earn, suggesting that sex differences in comparison standards were not based on supervisors' perceptions of pay in the field.

There are several possible explanations for these sex differences in comparison standards. One is that men and women socially compare with others in different specialty areas. As noted previously, the women in the sample were more apt than men to have chosen to specialize in personnel. Furthermore, personnel tends to be less well paid than other specialty areas within management (Wright, 1982). In general, the more an occupation is dominated by women, the less it tends to pay (Treiman & Hartmann, 1981). Thus, if women and men look to *same-specialty others* for social comparison, women would be comparing with a lower pay standard than would men. Although this explanation is supported by the low but significant negative correlations observed between specialty area and comparison standards for pay (see Table 3), this explanation does not add appreciably to an understanding of the findings of this study. Specifically, it was found that even when specialty area was controlled for (and hence any differences between women and men in comparison standards that were associated with specialty area were taken into account), comparison standards significantly diminished the association between gender and pay expectations (see Table 4). This suggests that the sex differences in comparison standards that explain the gender gap in pay expectations are not only those that result from differences in specialty area. That is, understanding why comparison standards predict sex differences in pay expectations requires looking beyond the specialty area.

A second possible explanation for sex differences in comparison standards is that men and women primarily look to *same-sex others* for social comparison purposes. This hypothesis is consistent with recent research (Crosby, 1982; Major & Forcey, 1982) indicating a preference for comparison of job outcomes with same-sex others. The pronounced sex-segregation of most occupations (Treiman & Hartmann, 1981) may contribute to and enhance this tendency. The general availability, salience, and similarity of same-sex friends and co-workers, as well as a past history of comparing performance with same-sex others (Zanna, Goethals, & Hill, 1975), may lead women to base their pay expectations on a generalized "women's standard" and men to base their pay expectations on a generalized "men's standard." Because women typically are paid less than men for doing comparable work (Treiman & Hartmann, 1981), women thus compare with a lower standard of pay than men do and hence expect less pay for themselves than men.

Yet a third possible explanation is that women and men may choose the same others for comparison but estimate their pay differently, perhaps because of differential exposure to pay information, differential attentiveness to pay information in general, or selective attention to or recall of certain specific information. The nature of the process underlying the sex differences observed in comparison standards is an important question for future research. Although social comparisons have been theorized to be important predictors of outcome expectations and satisfaction (Adams, 1965; Lawler,

1971), previous research on pay comparisons is limited (Andrews & Henry, 1963; Goodman, 1974; Lawler, 1965; Patchen, 1961) and generally has not investigated sex differences in comparison standards.

Consistent with some previous speculations and research (Crosby, 1982; Sauser & York, 1978), men placed a higher value on money than women did, whereas women placed a higher value on the interest of the work. These preferences, however, did not explain sex differences in career entry expectations and explained only a small portion of the variance in career peak expectations. Such sex differences in the values placed on career job outcomes, however, may relate directly to pay satisfaction, even though they are relatively unrelated to pay expectations. Contrary to previous speculations (Major & Deaux, 1982), sex differences in perceived job inputs (performance expectations, evaluations, and attributions), at least when assessed via reference to a specific job, did not appear to be viable mediators of sex differences in pay expectations.

Although the factors of career path, comparison standards, and job facet importance do not explain all of the male-female pay expectation gap, together they account for much of it: that is, almost three quarters of the variance in career entry expectations associated with sex and just over half of the variance in career peak expectations associated with sex. One qualification to these results, however, should be noted. Because of the timing of the questionnaire measures (pre and post internship) and the specific reference to the internship job in some questions, subjects' responses may have been affected by and somewhat specific to their internship experience. To the extent that this occurred, this may reduce somewhat the ability of the current data to predict and account for generalized pay expectations. One additional factor that might be considered in future research is the role of perceived discrimination. It might be hypothesized that women personally expect to earn less money than men because they believe that women in general are underpaid relative to men with similar qualifications. Such perceptions of discrimination may explain some of the remaining gap between women's and men's pay expectations.

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A Predictive Study of Organizational Turnover Rates¹

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This study extends turnover research to the organizational level of analysis. For sales personnel, turnover rates were reliably predicted by local economic activity and average employee age, tenure, time in present position, and education; for managers, few reliable predictors were found. Theoretical issues, research design, and aggregation problems are discussed.

Theory and practice in personnel and human resource management primarily has focused on the individual employee as the unit of analysis. Recently, however, several writers have suggested that more research be conducted at the organizational level of analysis (Baysinger & Mobley, 1983; Roberts, Hulin, & Rousseau, 1978; Schneider, 1982; Wallace, 1973). The present study extends research on employee turnover to the organizational level by considering voluntary turnover rates for management and sales personnel in 65 retail sales stores over a two year period.

There are several reasons why turnover rates should receive more attention. From an applied perspective, human resource management frequently is being viewed in the broader context of strategic management. Devanna, Fombrun, and Tichy (1981) discuss the value of conducting periodic audits of an organization's human resources to ensure congruence between personnel functions and the organization's human resource needs. A critical aspect of any human resource management audit would include forecasting the firm's demand for labor and the firm's supply of labor (Walker, 1980). Turnover rates are one of the major factors that affect the supply of labor. Mobley (1982) lists additional adverse organizational consequences associated with excessive turnover rates. From a managerial perspective, it is important to monitor turnover rates and to take corrective action when the costs of turnover become excessive.

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Accurate forecasting and planning of an organization's human resource requirements includes both an awareness of turnover rates and a strategy for keeping turnover rates at a desired level. But the development of strategies for dealing with turnover rates depends on the level of understanding of the construct under investigation. Researchers have tended to focus either on individual turnover following the tradition of industrial psychology or on turnover rates aggregated over organizations and industries as studied by economists. Although several models of individual turnover exist in the literature, it is not established if homology exists between functional relations found at the individual level of analysis and those that might exist at the organizational level of analysis. For example, age often is negatively correlated with individual turnover. Given this reliable finding, can it be concluded that turnover rates would be negatively correlated with the average age of the organization's workforce? Roberts et al. (1978) state that this relation might not be found. Wallace (1983) reinforces this possibility by drawing on an earlier paper by Heneman (1969) in which Heneman stated that progress in personnel and industrial relations will be limited until researchers are able to establish vertical synthesis across levels of analysis. In addition to the question of homology, research needs to be conducted that explicitly considers organizational level variables as predictors of organizational level turnover rates. Factors such as size, location, terms of employment contract, and operational policies and procedures are variables descriptive of organizations that have meaning at the organizational level and that might be related to differential turnover rates across organizations.

Theoretical work on comprehensive models of organizational level turnover is in the early stages. Bluedorn (1982) recently offered several propositions on the impact of turnover for individuals, organizations, and society. The focus of his work is on the effects of turnover where turnover is viewed as a predictor. Baysinger and Mobley (1983) also have written about organizational level turnover rates. Their concern is with identifying optimal levels of turnover rates so that better decisions about human resource utilization can be made. In particular, they discuss cost factors associated with various turnover rates and cost factors associated with different attempts to reduce turnover. It is important to recognize, however, that the above described work does not focus on specification of organizational antecedents of turnover rates. Consequently, both approaches ultimately must deal with the prediction of turnover in some form, either individual or organizational. But, as noted earlier, the question of homology has been infrequently examined.

In summary, there are both practical and theoretical reasons that justify the extension of turnover research to organizational level turnover rates. The strategic management of the firm's human resources requires accurate planning and forecasting of the firm's supply of labor. This is based in part on the diagnosis and control of turnover rates. But policies designed to control turnover rates should not be based on inference. They should be grounded in theory. Although turnover has been investigated at the individual level

by psychologists and at the aggregate level by economists, models designed to predict organization level turnover rates have yet to be developed. Such models should consider questions of homology, or vertical synthesis, across different levels of analysis. They also should consider, as new predictors, variables that naturally exist at the organizational level.

Development of Hypotheses

The literature on turnover was reviewed with particular emphasis on studies that examined organizational or departmental turnover rates as opposed to individual turnover behavior or aggregate labor market statistics.

Based on material cited in Roberts et al. (1978), Bluedorn (1982), Mobley (1982), and Parsons (1977), it has been demonstrated that aggregate measures of voluntary turnover are positively related to the level of business activity. Business activity has been operationalized in a variety of ways, often including some index of unemployment rate as a measure of demand for labor. The following hypothesis is made:

H1: Employees located in areas that have high demands for labor will have higher voluntary turnover rates than will employees located in areas that have low demands for labor.

Organizational size has been investigated as a predictor of voluntary turnover rates. Mobley (1982) summarizes this work. He states that, conceptually, large organizations might have low turnover rates because of greater internal mobility opportunities, more sophisticated human resource management processes, more competitive compensation systems, and more activities devoted to the management of turnover. But it also can be argued that large organizations will experience high turnover rates because of problems with communication, poor group cohesion, impersonalization, and bureaucratization. Published research supports no clear-cut conclusion. Thus, whereas it appears that size might be related to turnover rate, the direction of the relation cannot always be specified in advance. This leads to the second hypothesis.

H2: Turnover rates will vary as a function of organization size.

Another variable at the organizational level of analysis that has received some attention in the turnover literature is the organization's emphasis on participative and supportive work relations. Price (1977) suggests that turnover rates are highest in organizations that are centralized and lowest in organizations that encourage frequent communication and participation. Mobley (1982) similarly suggests that turnover rates are related to supervisory style—specifically, consideration and authoritarianism. That organizations differ on such dimensions as consideration, supportiveness, participation, and communication has typically been studied by those interested in organizational climate. But, rather surprisingly, research on organizational climate has not attempted to relate climate measures to turnover rates (Joyce & Slocum, 1979; Naylor, Pritchard, & Ilgen, 1980). In the present study, a measure of employee descriptions of organizational practices conceptually similar to Likert's organizational practices scale (Likert, 1967) was available

for analysis. High scores on the scale indicate descriptions of a participative and supportive climate. Based on the above research, the third hypothesis is made:

H3: Voluntary turnover rates will be negatively correlated with employee descriptions of organizational support and participativeness.

Composition of the labor force is another variable that has been discussed in the context of organizational turnover rates. Schein (1978), taking a macro labor-economic view, suggests that the labor market for young employees will become increasingly competitive and this could lead to increased turnover within this age group. Pfeffer (1982), looking at the level of the organization, suggests that organizational differences in the demography of the workforce might be related to organizational differences in turnover rates, as well as to differences in other organizational level variables. He develops an argument that organizational demographics might prove to be an important systemic feature of organizations, and he notes that research is needed to determine empirically the utility of demographic variables as predictors of important organizational outcomes. Finally, Baysinger and Mobley (1983) also mention the demographic composition of the organization's workforce as a potentially important predictor of organizational turnover rates. Earlier it was suggested that relations among personal demographic characteristics and individual turnover might not pertain to organizational demographic characteristics and organizational turnover rates. Although the empirical literature is sparse, there is some evidence of homology. Parsons (1977), in a study of turnover rates across industries, found evidence showing turnover to be highest in the industries with young employees, in industries with brief tenured employees, and, when holding salary constant, in industries with highly skilled employees. Given the above theoretical and empirical literature, the following hypotheses are made regarding organizational demographics and turnover rates:

H4: Voluntary turnover rates will be negatively correlated with the average age of the organization's workforce.

H5: Voluntary turnover rates will be negatively correlated with the average length of service of the organization's workforce.

H6: Voluntary turnover rates will be negatively correlated with the average length of time in present position of the organization's workforce.

H7: Voluntary turnover rates will be positively correlated with the average level of education of the organization's workforce.

H8: Voluntary turnover rates will be positively correlated with the average level of ability of the organization's workforce.

Method

Sample

As part of a larger study on retail store effectiveness, archival data were collected from personnel files in 65 retail sales stores all belonging to the

same international merchandising organization. The stores were located in 65 different Standard Metropolitan Statistical Areas (SMSA's). None of the stores was unionized. Within the 65 stores, data were collected for two employee groups: management staff and full time retail sales personnel.

Operationalization of Variables

Voluntary turnover rates for management and sales personnel were computed separately, following procedures recommended by Mobley (1982). First, the number of voluntary quits for the year was divided by the number of people on the payroll for the year. Second, this figure was multiplied by 100 to produce an annual voluntary turnover rate. Voluntary turnover was differentiated from involuntary turnover on the basis of exit interview information and other data from store personnel files. Data are from 1977 and 1978.

Labor market opportunity was assessed in two different ways. First, monthly local unemployment figures for nonfarm workers were taken from Bureau of Labor statistics for 1977 and 1978 (U.S. Government, 1978, 1979). The average monthly unemployment rate was computed for each year. This index represents an overall measure of local labor supply that existed during the year in which the turnover rates were computed. In addition, statistics were obtained from the Conference Board for the same period (Conference Board, 1977, 1978, 1979). The Conference Board records a help wanted index, which is based on the number of jobs listed in the classified section of newspapers in major cities throughout the United States. The statistics for each sampled city are normed by the Conference Board to a base of 100, which reflects the national average of newspapers covered in 1967. In the present study, this index represents one measure of the local demand for labor. Data are for 1977 and 1978.

Organization climate was assessed with aggregate employee responses to 20 items imbedded in a larger employee survey that was administered regularly to all store employees on a volunteer basis. The survey was administered during the first few months of 1977. It was not administered during 1978. Specifically, the scale used here corresponds to the organizational practices scale identified by Likert (1967) in his System IV theory of organizations. Stems from two sample items are: (1) I receive advance information regarding the things going on in my division or department, and (2) I would feel free to go "all the way to the top" if I felt I was being treated unfairly. A series of previous studies has shown the scale to be reliable (alpha ranges from .85 to .88); to differentiate, validly, store climate across stores; and to be predictive of unionization activity and store performance (Terborg, 1982; Terborg & Shingledecker, 1982). High scores indicate a System IV type organization. Average item scores were computed separately for managers and for retail sales personnel in each of the 65 stores. Before aggregate employee descriptions can be meaningfully interpreted as reflecting an attribution of the organization, Jones and James (1979) recommend that a one-way

ANOVA be conducted using organization as levels of the independent variable and employee descriptions as the dependent variable. A significant F -ratio indicates that employee descriptions vary between organizations to a greater extent than they vary within organizations. For both managers and sales personnel, the ANOVA was significant (Managers: $F_{64,1775}=3.67$, $p<.01$, eta-squared=.12; Sales personnel: $F_{64,6687}=4.98$, $p<.01$, eta-squared=.05). These results are consistent with findings from previous climate research and suggest that in the present study employee descriptions can be aggregated to the level of the organization for both employee groups (Jones & James, 1979).

Average workforce demographic characteristics were computed for each store on age, education, tenure, time in present assignment, and ability. Scores for managers were computed separately from those for retail sales personnel. Age, tenure, and time in present assignment were measured in years. Education was measured on a 5-point classification system used by the company: 1=some high school and 5=work beyond college degree. Ability was measured by taking the average of the total verbal and quantitative test score obtained on the most recently administered personnel selection test. Because different tests were used for management and retail sales personnel, scores for management cannot be compared to those for retail sales personnel. All scores reflect the store average for employees on the payroll on the last working day of the year preceding the 12-month period for which the turnover rates were computed, that is, demographics for managers and sales personnel on the last working day of 1976 were used to predict turnover rates for 1977.

Finally, store size was operationalized as the number of full time and regular part time employees on the payroll on the last working day of the year preceding the 12 months for which the turnover rates were computed. This figure excludes temporary part time help hired for the Christmas season.

In summary, turnover rates, average annual unemployment rates, and average annual help wanted scores were calculated for 1977 and 1978. During 1977 the employee attitude survey also was administered. Store size and average demographic scores were based on personnel figures for the last working day of the calendar year immediately preceding the 12 months during which turnover rates were computed.

Results

The results are presented in two sections.

Examination of Hypotheses

Variable means, standard deviations, and correlations can be found in Tables 1 and 2 for managers and sales personnel, respectively.

The first hypothesis predicted a positive relation between voluntary turnover rates and local labor demand for labor. Looking first at the manager

Table 1
Means, Standard Deviations, and Intercorrelations: Management Sample^a
(N = 65)

Variable	1977		1978		t-value	1	2	3	4	5	6	7	8	9	10
	Mean	S.D.	Mean	S.D.											
(1) Turnover rate	2.86	5.92	4.23	8.45	-1.11	(.08)	-35	01	06	09	-02	10	-13	24	06
(2) Climate	3.27	.16	—	—	—	09	(—)	-26	08	-19	-15	-24	20	01	-10
(3) Unemployment rate	7.09	1.80	6.02	1.55	9.14*	-18	-29	(85)	-24	-08	-05	-03	-03	-20	-13
(4) Help wanted	116.35	55.44	147.60	76.79	-11.07*	11	08	-21	(99)	05	07	01	03	11	-12
(5) Age	39.54	4.00	40.37	4.10	-4.60*	-15	-15	-06	10	(94)	88	65	-40	01	54
(6) Tenure	14.88	3.26	15.63	3.43	-4.46*	-22	-07	-08	11	88	(92)	69	-36	05	38
(7) Present position	3.22	1.63	3.50	1.61	-3.33*	-21	-17	-08	-05	63	66	(91)	-31	08	41
(8) Education	3.90	.44	3.88	.60	.31	01	37	09	-06	-27	-15	-13	(47)	10	-39
(9) Ability	112.90	10.77	113.30	11.55	-46	-10	00	-02	12	-07	-01	-04	05	(81)	03
(10) Size	526.90	232.81	533.86	245.62	-4.26*	-22	08	-16	-18	49	31	44	-28	-10	(98)

^aDecimal points have been omitted for correlations. Correlations in the upper right portion of the matrix are for 1977; correlations in the lower left portion of the matrix are for 1978. Correlations in parentheses are reliabilities between 1977 and 1978. Climate was measured only during 1977. $r \geq .20$, $p < .10$; $r \geq .25$, $p < .05$.

* $p < .05$

Table 2
Means, Standard Deviations, and Intercorrelations: Sales Personnel Sample^a
(*N* = 65)

Variable	1977		1978		<i>t</i> -value	1	2	3	4	5	6	7	8	9	10
	Mean	S.D.	Mean	S.D.											
(1) Turnover rate	7.43	7.78	8.08	5.42	-7.4	(48)	17	01	32	-27	-51	-35	31	17	-10
(2) Climate	3.21	.12	—	—	—	26	(—)	-27	18	-17	-35	-47	19	13	-09
(3) Unemployment rate	7.09	1.80	6.02	1.55	9.14*	-24	31	(85)	-24	-01	03	17	-12	-12	-13
(4) Help wanted	116.35	55.44	147.60	76.79	-11.07*	45	20	-21	(99)	-20	-19	-10	06	02	-12
(5) Age	39.39	5.74	39.81	3.39	-.80	-59	-34	13	-20	(68)	61	46	-21	-03	16
(6) Tenure	8.96	2.46	9.26	2.40	-3.96*	-61	-36	16	-21	90	(98)	72	-43	-34	19
(7) Present position	3.76	1.68	3.91	1.60	-2.88*	-61	-46	28	-13	79	77	(97)	-41	-29	11
(8) Education	2.45	.21	2.45	.22	-.14	55	19	-34	20	-51	-47	-48	(92)	45	-08
(9) Ability	64.35	5.18	64.07	5.56	2.06*	37	15	-22	03	-38	-37	-35	51	(98)	-10
(10) Size	526.90	232.81	553.86	245.62	-4.26*	-23	-09	-16	-18	38	19	14	-15	-15	(98)

^aDecimal points have been omitted for correlations. Correlations in the upper right portion of the matrix are for 1977; correlations in the lower left portion of the matrix are for 1978. Correlations in parentheses are reliabilities between 1977 and 1978. Climate was measured only during 1977. $r \geq .20$, $p < .10$; $r \geq .25$, $p < .05$.

* $p < .05$

sample, no support was found for this hypothesis. None of the four correlations was significant. A different pattern emerged, however, when sales personnel were examined. As predicted, the help wanted index was positively correlated with voluntary turnover rates for both 1977, $r = .32$ and 1978, $r = .45$. Turnover rates were highest in stores that were located in areas with a high demand for labor as reflected by a large number of jobs listed in the classified section of the local newspaper. The local unemployment rate was unrelated to voluntary turnover rates for 1977, but approached significance levels for 1978, $r = -.24$, $p = .06$. As predicted, for 1978 the relation was negative. Thus, there was no support for the first hypothesis using the management sample, but there was some support using the sales personnel sample.

The second hypothesis predicted a relation between store size and voluntary turnover rates, although the precise form of the relation was unspecified. Inspection of Tables 1 and 2 shows a similar pattern of results for both employee groups. Size was unrelated to voluntary turnover rates during 1977, but it approached significance for both groups during 1978, with $r = -.22$ for managers and $r = -.23$ for sales personnel ($p < .10$). These data do not disconfirm Mobley's observation that size might be positively related to the organization's capacity and willingness to control turnover. These data, however, are counter to past results showing a positive relation between work unit size and voluntary turnover rates. Of course, one might question whether store size and work unit size are equivalent measures of the common construct. Finally, there is some suggestion that size might be curvilinearly related to turnover rates with small and large organizations having the least turnover (Bluedorn, 1982). To investigate this possibility scatterplots between size and turnover rates were examined separately for both employee groups for both years. There was no evidence of a curvilinear relation.

The third hypothesis predicted a negative relation between employee descriptions of organizational supportiveness and voluntary turnover rates. Table 1 indicates a significant and negative correlation between manager descriptions of the climate toward supportiveness assessed in 1977 and 1977 voluntary turnover rates, $r = -.35$, $p < .01$. There was no relation, however, between climate assessed in 1977 and turnover assessed in 1978. The results for sales personnel were quite different. There was no relation between climate and turnover rates for 1977, and there was a positive relation between reported level of supportiveness and voluntary turnover rates for 1978, $r = .26$, $p < .05$. This latter finding was opposite of that predicted. Closer inspection of intercorrelations among the variables provided a possible explanation for these findings. Climate, especially for sales personnel, was strongly related to several of the demographic variables. Furthermore, demographics were related to turnover rates. Consequently, a more accurate test of the climate-turnover hypothesis might be obtained through examination of the partial correlation, holding demographics constant. Partial correlations were computed for both managers and sales personnel groups. The results were unaffected for the manager sample, with the zero-order correlations being $-.35$ and

.09 for 1977 and 1978 and the fifth-order partial correlations being $-.34$ and $.10$. But when demographics were controlled in the sales personnel sample, the zero-order correlations for both years dropped to near zero, with the zero-order correlations being $.17$ and $.26$ for 1977 and 1978 and the fifth-order partial correlations being $-.01$ and $-.02$. Overall, limited support was found for Hypothesis 3.

Hypotheses 4 through 8 related store demographics to store turnover rates. For both managers and sales personnel, turnover rates were predicted to be negatively correlated with average employee education and ability. Looking first at the manager sample, the results were mixed and inconsistent. For 1977, average ability, operationalized with valid tests of verbal and quantitative aptitude, was the only demographic variable even to approach statistical significance, $r = .24$, $p = .06$. For 1978, average tenure and average time in present assignment approached statistical significance, $r = -.22$ and $r = -.21$ respectively ($p < .10$). The pattern of results was inconsistent over the two year period, and only three of eight correlations approached significance. Those correlations, however, were in the predicted direction. In contrast, rather strong relations were found between store demographics and store turnover rates using the sales personnel sample. For 1977 and 1978, average employee age, tenure, and time in present assignment were all significantly and negatively correlated with turnover rates; and average education was significantly and positively correlated with turnover rates. Average ability was significantly correlated with turnover rates only for 1978. All 10 correlations were in the predicted direction, and 9 of 10 were statistically significant. It appears from these data that differences in sales personnel turnover rates across stores belonging to the same international organization can be explained by differences in sales personnel demographics aggregated to the store level. But, these findings seem to apply only to sales personnel; none of the relations for managers was significant.

In summary, there was virtually no support for hypothesized relations using the management sample. The only exception was a negative association between store climate and turnover rate for 1977, which supported the prediction of lower turnover rates in stores with participative rather than autocratic climates. On the other hand, using the sales personnel sample, six of eight hypotheses received support. For this group, turnover rates were positively associated with local demand for labor and with average levels of employee education and ability; and turnover rates were negatively associated with average levels of employee age, tenure, and time in present position. Turnover rates were not reliably associated with store size or with store climate, once demographics were controlled.

Additional Questions

The data base allowed investigation of other important questions regarding turnover rates. First, implicit in attempts to control turnover rates is the assumption that turnover rates are relatively stable over time. At the

individual level of analysis, the stability of turnover behavior usually is not considered—that is, do some people reliably change jobs more frequently than do other people? But at the organization level it is important to know if turnover rates from one period of time predict turnover rates at another period of time. As seen in Table 2, across the 65 stores included in this study there was little stability in turnover rates among managers. The correlation between 1977 and 1978 was $r = .08$. But Table 2 shows some evidence of stability in turnover rates among sales personnel. For this employee group, the correlation between 1977 and 1978 was $r = .48$.

Table 3
Turnover Rates as a Function of
Organizational Climate, Job Availability,
Organizational Demographics, and Organizational Size

Variable Set	Number of Variables in Set	1977: Managers				1978: Managers			
		R ²	p	R ² Unique ^a	p	R ²	p	R ² Unique	p
Organizational climate	1	.12	.01	.10	.05	.00 ^b	NS	.00	NS
Job availability	2	.00	NS	.00	NS	.04	NS	.04	NS
Demographics	5	.14	.10	.11	NS	.07	NS	.08	NS
Size	1	.00	NS	.00	NS	.05	.10	.06	.10
Total set	9	.25	.06			.18	NS		
		1977: Sales Personnel				1978: Sales Personnel			
		R ²	p	R ² Unique	p	R ²	p	R ² Unique	p
Organizational climate	1	.03	NS	.00	NS	.07 ^b	.05	.01	NS
Job availability	2	.11	.05	.06	NS	.22	.01	.09	.05
Demographics	5	.28	.01	.21	.01	.50	.01	.34	.01
Size	1	.01	NS	.00	NS	.05	.10	.01	NS
Total set	9	.34	.01			.60	.01		

^aR² unique is the R² change in the full model when that variable set was removed from the regression equation.

^bClimate was measured only during 1977.

A second question dealt with the relative "importance" of the different predictor sets. The results are presented in Table 3. First, turnover rates were regressed separately on the predictor sets of (a) climate, (b) job availability, (c) store demographics, and (d) store size. The *R*-squared for each equation would be one index of relative "importance." Second, to control for collinearity, the drop in variance resulting from the removal of the predictor set from an equation that entered all variables into the model also was computed. This change is sometimes referred to as the "unique" variance associated with that predictor. Looking first at the manager group, climate emerged as the best predictor of 1977 turnover rates. For 1978, however, none of the variable sets emerged as strong predictors. For sales personnel, demographics accounted for substantial amounts of variance in turnover rates for both 1977 and 1978. In addition, job availability predicted turnover rates for 1978. It is perhaps important to note that the overall predictability of turnover was greater for sales personnel than for managers and

that more variance was accounted for in 1978 than in 1977, whereas the opposite pattern occurred for managers. This latter finding cannot be attributed to restriction of range in the management sample; the standard deviation in turnover rates was greater for managers than for sales personnel in 1978.

A third issue concerns cross-validation of results. Again, attempts by the organization to control turnover implicitly assume that predictive relations can be found. To examine this question, tear-down regression was conducted for each employee group for 1977. Variables that remained in the equation (a criterion of $p < .05$ was specified) were used to predict turnover rates in 1978. For 1977, climate and average ability emerged as predictors of management turnover rates (R -squared = .18, $p < .05$). The raw score weights were applied to 1978 data in an attempt to cross-validate the findings. The cross-validated correlation was $r = -.05$. Obviously, the weights derived from 1977 data had no predictive value. For 1977, the help wanted index and average tenure emerged as predictors of sales personnel turnover rates (R -squared = .31, $p < .01$). The raw score weights were applied to 1978 data and produced a cross-validated correlation of $r = .46$. Thus the 1977 weights were able to account for 21 percent of the variance in 1978 turnover rates.

Many models of individual turnover include some form of opportunity to leave. This stems from the often found relation between turnover rates and level of economic activity (Roberts et al., 1978). But economic activity can be operationalized in many ways. The present study examined two common operationalizations: local unemployment rate, or the demand for jobs; and local help wanted advertisements, or the demand for labor. At an intuitive level, though one would not expect a perfect negative correlation between the two measures, these measures might be viewed as alternative operationalizations of economic activity. The data show negative but weak correlations between the two measures. For 1977, $r = -.24$ and for 1978, $r = -.21$. Both correlations approach statistical significance ($p < .10$). The variables were rather stable over the two year period with reliability being $r = .99$ for the help wanted index and $r = .85$ for the local unemployment rate. Thus the low intercorrelations are not likely caused by low reliabilities.

Models of individual turnover also suggest that opportunity might moderate the relation between job satisfaction and actual turnover. Although existing studies rarely support the hypothesized interaction (Bluedorn, 1982) it has intuitive appeal and merits continued examination. In the present study it was possible to consider an organizational level analysis of the proposed moderator effect of opportunity. Specifically, voluntary turnover rates were examined as a function of organizational climate, job opportunity, and the joint product term. A total of eight moderated regressions were calculated, one for each employee group for 1977 and 1978 using both operationalizations of job opportunity. In none of the equations did the joint product term even approach statistical significance. Thus these results at the organizational level of analysis are consistent with individual level data.

A final research question considers whether managers have different turnover rates from those of sales personnel. If managers in retail sales have greater firm specific skills than do sales personnel, then human capital theory predicts lower voluntary turnover among managers (Becker, 1964). Also, managers, as a result of long employment with the company, probably are more committed to the goals of the organization than are sales personnel and are less likely to quit than are sales personnel; quitting would be inconsistent with their previous behaviors (Mowday, Porter, & Steers, 1982). For both 1977 and 1978, turnover rates among managers were significantly lower than turnover rates among sales personnel (1977: managers $\bar{X}=2.86$; sales personnel $\bar{X}=7.43$; $t=3.84$, $p<.01$; 1978: managers $\bar{X}=4.28$; sales personnel $\bar{X}=8.08$; $t=3.69$, $p<.01$).

Discussion

Recent reviews of the turnover literature suggest that research attention be directed toward understanding organization level turnover rates when characteristics of the organization and the organization's labor market are used as predictors (Baysinger & Mobley, 1983; Bluedorn, 1982; Muchinsky & Morrow, 1980). Such studies are needed if a comprehensive model of turnover is to be developed that spans different levels of analysis and if organizations are to control and forecast effectively their human resource needs. The present study represents a beginning contribution to the almost nonexistent literature on organizational turnover rates. To the authors, one of the most striking aspects of the turnover data was the lack of consistency in results over time and the lack of consistency in results between management and sales employee groups.

Consider the results over time for managers. First, based on 65 stores, voluntary turnover rates between 1977 and 1978 correlated only $r=.08$. Second, the median difference in validities of identical predictor-turnover pairs (for example, the difference between the ability-turnover correlations from 1977 to 1978 was calculated to be .34 correlation points) over the two year period was .20, with a low of .05 for the help wanted-turnover relation and a high of .44 for the climate-turnover relation. Thus, predictive relations with turnover were not stable. Third, even though the frequency of turnover and the variation in turnover rates increased from 1977 to 1978, which would help minimize statistical problems of low base rate and restriction of range, the overall predictability dropped from 25 percent of the variance (shrunk R -squared estimated to be 13 percent) in 1977 to 18 percent of the variance (shrunk R -squared estimated to be 5 percent) in 1978. Finally, variables that predicted turnover rates for 1977 produced a negative cross-validated correlation when applied to 1978 turnover rates ($r=-.06$). However, all but one of the predictors had reliabilities greater than .80 (average education correlated .47), and comparison of relations among the predictors across the two year period showed remarkable stability with a median difference of .06 correlation points. Perhaps turnover rates are inherently

unstable outcomes when assessed at the level of the organization and this lack of reliability is the most parsimonious explanation for the lack of predictability.

The data are somewhat different, however, when sales personnel are considered. First, voluntary turnover rates correlated $r = .48$ between 1977 and 1978. Although this value is not large when considered in the context of test construction and validation research, it is representative of correlations among behaviors measured at different time periods (Epstein, 1979). Thus, there is some evidence of stability in turnover rates experienced by the 65 stores when sales personnel are examined. Second, given the greater stability among sales personnel than management, one might expect a smaller median difference in validities between identical predictor-turnover pairs over the two year period. But the obtained value was .20, which was identical to that of the management sample. It should be noted, however, that although both groups had the same value, within the management sample the differences would be associated with different interpretations, whereas for sales personnel the interpretations for 1977 and 1978 would be quite similar. Third, as seen with managers, there was a change in the variance of turnover rates across the two year period; however, the variance more than doubled in size for managers from 1977 to 1978, but the variance was halved for sales personnel from 1977 to 1978. Thus, comparable amounts of change occurred but they did so in opposite directions. Similarly, though the overall predictability of management turnover declined, the predictability of sales personnel turnover increased from 34 percent of the variance (shrunk R -squared estimated to be 47 percent). This increase was observed even though there was reduction in the overall range of turnover rates. Finally, there was evidence of stability when cross-validation was conducted. Weights derived using 1977 data accounted for 21 percent of the variance in 1978 turnover rates. In addition, the predictors demonstrated high reliability with all but two being above $r = .90$, and relations among predictors over the two year period were quite stable with a median difference of .03 correlation points. It appears that although evidence of change was found with the sales personnel sample, the conclusions are nearly opposite to those reached using the management sample. Turnover rates among sales personnel can be reliably predicted from knowledge of local job availability and average employee tenure.

Mobley (1982) listed several concerns at the conclusion of his book on turnover. One of those was the lack of research on turnover as a process. One-time measures and subsequent bivariate correlational analysis are unable to detect changes among variables. The current study, although it deals with turnover rates and not individual turnover, provides an example of what could happen if data were collected for only one time period. With managers, substantively different conclusions would be derived for each year. With sales personnel, confidence in the strength of relations would vary. These results, if replicated with other samples, have important implications for

the development of a general theory of turnover and for an organization's ability to control and forecast its human resource needs.

Complexities stemming from aggregation represent another important issue associated with the current study and with future research on turnover rates. A few of the more salient ones will be mentioned. Occupational grouping was shown to be critical for interpreting the results. Although previous work suggested possible differences in turnover rates, there was little expectation of substantial differences in reliabilities or in predictive validities. Based on these findings, future work on turnover rates should explicitly consider occupational effects. For example, managers probably have career stages different from those of nonmanagers, and this could impact their ease of movement through organizational boundaries. Scholl (1983) and Veiga (1983) give discussions of career stage and employee mobility. It also should be noted that local unemployment rates and job availability indices might not accurately reflect the demand for employees with particular skills and industry backgrounds. General measures of the overall local economy might have limited utility. Rather, specific indicators might be needed for different occupational groups. It has been noted, however, that research conducted by labor economists has been able to discern reliable relations between general measures of the business cycle and turnover rates (Roberts et al., 1978). Those studies did not attempt to match unemployment rates and turnover rates by occupation. They also did not attempt to measure individual perceptions of alternative employment. Yet the results obtained in such aggregate studies are quite robust. Finally, one could ask how occupational groups should be defined. Which jobs are to be aggregated into which groups? As Pearlman (1980) notes, taxonomic work attempting to define job families has not produced unified results.

A second aggregate question concerns time. Process models should attempt to specify where cycles might exist and the shape of those cycles (Roberts et al., 1978). At present, there is little guidance on how long a measurement period should be, but this is critical if an organization hopes to forecast accurately future human resource needs. In the present study using cross-sectional data, differences in organizational turnover rates were weakly related to differences in the local economy. One might question, however, if cross-sectional data are appropriate, or if some time lag should be imposed. To consider this possibility, economic data from 1977 were correlated with the succeeding year's turnover rates. In all instances, concurrent year data produced higher correlations than lagging turnover by year. Again, these findings seem to be in partial conflict with those from labor economics (Roberts et al., 1978). But when the current data are aggregated over stores and examined for a two year period, there is support for the hypothesized relations. Examination of 1977 and 1978 means from Tables 1 and 2 show an overall increase in voluntary turnover rates, an overall decrease in unemployment rates, and an overall increase in help wanted advertising. Support for the relation between economic activity and turnover varies with the form of aggregation one chooses to impose on the data. This is not

too surprising, given the expanding awareness of statistical issues associated with aggregated data, but it certainly is unsettling.

The above discussion underscores a third issue about aggregated data. Oftentimes, different levels of analysis produce different meanings and interpretations, and care must be taken to avoid generalizing relations to other levels of analysis, that is, the ecological fallacy (see Roberts et al., 1978, for a thorough discussion). For example, the present data suggest homology between tenure and turnover at individual and organizational levels of analysis. But organization level findings should not necessarily be interpreted as resulting from higher turnover among lower tenure individuals. Comparison of average tenure between succeeding years would not add clarification because many different combinations could yield the same organization level change. Some of these problems can be avoided if care is taken when formulating interpretations and conclusions. But a second and more difficult problem might remain. The way data are grouped can affect the values that statistics take. Blalock (1964) discusses four grouping procedures. If cases are randomly assigned to groups, correlations among group means will be the same as correlations among individual data. Such assignment rarely happens. Spuriously high correlations can be produced when cases are aggregated to maximize variance in either the predictor or the criterion. The most common grouping procedure in organizational research aggregates cases on the basis of proximity—for example, organization. This is how the present data were grouped. A problem with this method is the difficulty in distinguishing among correlations produced through the process of aggregation such as might occur given the higher reliabilities of aggregate measures, among correlations produced by an unknown or unmeasured macro-level variable, and among correlations produced by a valid relation among variables assessed at a common level of analysis. Solving this problem, however, is exactly what Heneman (1969) was talking about when he foresaw the need for vertical synthesis in organizational theories and models. Researchers should not shy away from studying turnover rates because of the problems noted above. In fact, because of these problems, there should be an increase in such research. The present study just begins to address some of these issues.

Summary

Organizational turnover rates were studied for a two year period using data from 65 stores belonging to the same international merchandising organization. Managers and sales personnel were considered separately. Nine variables grouped into the four sets of (a) local economic activity, (b) organizational climate, (c) organizational demographics, and (d) organizational size were used to predict annual voluntary turnover rates. Few consistent findings were observed with the manager sample. In contrast, turnover rates among sales personnel were reliably predicted from knowledge of organization demographics and availability of alternative jobs in the local labor

market. In general, stores having the highest turnover rates tended to be in areas of expanding economic activity and to have, on the average, young, low tenured, and highly educated personnel.

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Technology and Interorganizational Activity as Predictors of Client Referrals¹

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The client referral activity of 41 human service agencies operating within the same community was examined using recently collected data. Hypotheses were developed focusing on agency service technology and interagency activity as predictors of referrals from and to other organizations. The hypothesis for technology was supported; hypotheses for interagency activity received mixed support. Additional analysis revealed an agency's service orientation to be a strong predictor of referral inflows.

Because the flow of resources pervades all major organizational processes and activities, it should be apparent that the study of resource links between organizations is crucial to an understanding of organizational behavior. This is particularly true for understanding interorganizational relations, as Van de Ven (1976) has noted. Yet, despite their overall importance, the impact of resource links on an organization's structure and activities may vary considerably, depending on such factors as the types of resources involved, the structure and formalization of the relationship between organizations engaged in resource exchanges, and the direction and intensity of the resource flow.

Many resource exchanges involve a monetary exchange for such resources as raw materials or finished goods, but others do not. One of the important nonfinancial resources exchanged among organizations is clients. Clients represent the major nonmonetary resource sought by most service organizations. Although organizations often acquire clients through their own independent efforts, the acquisition of this resource also can be accomplished through the use of referrals.

There is a considerable body of literature on referrals as they affect clients and client services, particularly among health care organizations. However,

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though referrals can be an important means by which clients flow to and from an organization, with some exceptions (Aldrich, 1976; Boje & Whetten, 1981) there have been few attempts by researchers having an organizational perspective to explore the topic in any depth. Several organizational researchers have measured client referrals as one aspect of their work but have tended not to emphasize referrals when analyzing and discussing their findings, focusing instead on the broader area of interorganizational relations (Hall, Clark, Giordano, Johnson, & Van Roekel, 1977; Levine & White, 1961; Whetten, 1978). Other authors have specifically discussed client referrals as an organizational phenomenon but have provided little or no data on the referral process or on those organizational characteristics most closely associated with referrals (Pfeffer & Salancik, 1978).

Those authors who have examined referrals from an organizational perspective have tended to focus on referral networks consisting of similar organizations having referral relationships that have been mandated by law (Aldrich, 1976; Boje & Whetten, 1981). This approach is useful for examining behavior within a specific and well-defined network of organizations. However, much of the referral activity of human service agencies is not mandated by law and involves a rather diverse set of service organizations within a community. Because human service agencies are so prevalent in most communities and because referrals play an important role in the delivery of services to clients, a broader understanding of the referral activity of these organizations is needed for both practitioners and students of organizations.

The study reported here attempts to explain those organizational characteristics that best predict both sides of the referral process, referrals from and referrals to other organizations. Data were collected on a heterogeneous sample of 41 human service agencies operating in a single community. No attempt was made to examine each agency's ties to any one particular referral network other than the broadly defined community human service network to which all agencies belonged. Rather, the focus was on developing a general understanding of agency referrals regardless of network affiliation. This is particularly important because most human service agencies engage in referral activity with many organizations without regard to artificially defined network boundaries.

Theory Development

Background

For human service agencies, one of the most crucial resources is clients. Although other resources are also needed, clients are the raw materials of human service agencies and thus are the focus of most agency activities. In fact, the acquisition of clients often is a major factor contributing to the capacity of an agency to attract other resources, particularly funding (Scott, 1967; Thompson, 1967).

Clients can be acquired without the involvement of other organizations, especially when an agency's services are well-defined and well-known in the community and when the agency itself makes independent and direct efforts to attract clients. However, a major alternative source of clients is the other human services organizations in the community.

Besides the acquisition of clients through referrals, agencies also may send their clients to other human service organizations. Clients often have multiple problems that few agencies can serve fully. Additionally, some client problems are sufficiently ill-defined that a decision as to which agency might best serve the problems of any one client may be unclear. Thus, many clients will be served or at least evaluated by one agency and then referred to another.

Despite the importance of referral activity for human service agencies and for the clients they serve, no broad theory yet exists for explaining this phenomenon. Some inferences can be made from the more general theory of interorganizational relations, particularly resource-dependence theory (Aldrich & Pfeffer, 1976; Pfeffer & Salancik, 1978), although referrals are sufficiently different from other types of interorganizational activities to warrant modification of these more general approaches.

One common theme of resource-dependence theory and other literature on interorganizational relations is the important role played by interorganizational linkages in helping to reduce uncertainty for organizations (Osborn & Hunt, 1974; Pennings, 1981; Pfeffer & Salancik, 1978). By receiving referrals from other organizations, agencies can reduce some of the uncertainty as to whether or not a sufficient number of clients will come to the agency to justify increases in or at least maintenance of funding. When clients are sent from other organizations, an agency need not depend solely on its own efforts to attract this critical resource. Furthermore, these clients have been prescreened by the referring organization so that they are more likely to fit the receiving agency's service capabilities than are many walk-in clients. Thus, some of the uncertainty regarding what type of needs clients will have can be reduced.

Agencies also can reduce uncertainties through the process of referring clients to other organizations. The uncertainty here is internal and stems from having clients that the agency cannot serve. By having an outlet for these clients, the agency's operations can become more routinized; it can serve the clients it is capable of serving, using preestablished technologies, and it need not be concerned with providing all services to all the clients it attracts. In theory, agencies could reduce this internal uncertainty either by simply refusing to serve some of its clients without referring them or by developing methods to serve all clients it received regardless of their needs. However, both these strategies are unlikely, the first because of the negative reputation that would accrue to the agency (thus limiting its capacity to attract further clients and funds), and the second because of the prohibitively high costs of providing all services to all clients.

From the above discussion, it should be apparent that the referral activity of an agency is strongly tied to its level of involvement with other

organizations, consistent with resource-dependence ideas. Not as obvious but equally important is the tie between referrals and service technology. Because resources are limited, agencies are constrained as to the number and types of services they can provide to clients. Additionally, competitive pressures encourage specialization of services. Finally, the type of service and methods of service delivery generally are constrained by such factors as agency tradition and available expertise. Because of these constraints on service and delivery service, agencies are dependent on other agencies, through the process of referrals, to serve those clients that they themselves cannot or will not serve. This dependence on other organizations is again consistent with resource-dependence ideas. The three hypotheses proposed below focus specifically on service technology and interagency activity as the main predictors of agency referrals.

From observations and from discussions with agency executives and others involved in agency activities during the formulation of this project, it became apparent that referral activity, though valued, was less a conscious strategy of organizational management than a function of certain characteristics of the agency; in particular, service technology and interagency involvement. Certainly agencies can and would avoid referrals if they thought it would not be helpful to their own interests and to those of clients. However, the active avoidance of referrals is unlikely, given the importance of this activity to many clients and many agencies. Although some portions of referral activity may be part of an agency's interorganizational strategy, the view here is that most referrals are closely tied to certain specific organizational characteristics that tend to encourage that activity. Although these characteristics ultimately are controllable by agency management, at least over the long run, referral activity can best be viewed as a consequence of these characteristics rather than as a specific type of interorganizational strategy.

Hypotheses

Based on observation, discussions, and the theoretical rationale that follows, two groups of variables were identified as being relevant for explaining referrals. The first of these, agency service technology, is an internal organizational measure of the intensiveness of services provided to clients. The second group focuses on interagency activity and includes a measure of interexecutive communication and two measures of joint program activity. The general thesis is that a high level of service technology intensiveness and interagency activity will be positively associated with both referral inflows and outflows.

Service Technology. Because referrals involve clients and because the primary reason that human service agencies exist is to serve clients, the nature of the services provided by an agency is critical for understanding referral activity. Rather than being an interorganizational strategy developed by agency management to reduce uncertainty or to gain power in the environment, referral activity is looked on here as a consequence of the way in which

an agency's clients are served. Unless actively resisted by agency management, depending on the way in which services are provided, some agencies will attract many clients through the process of referrals, and some will send their clients to other organizations. In both cases, however, agencies will be dependent on other organizations. For explaining referral activity, the critical measure of service technology is hypothesized to be the intensiveness of the services provided.

It is apparent that technology is important for organizations, but no clear consensus has yet emerged as to how it affects organizational structure, processes, or behavior. A major reason for this confusion is that researchers often use measures of technology that are appropriate for some organizations but not others. This problem is particularly acute when examining service sector organizations because their technologies are quite different from the goods-producing organizations that have been the focus of much of the past research on technology. One approach for measuring technology among service sector organizations that has been addressed at least implicitly by a number of organizational researchers is the intensiveness of the services provided (Dewar & Hage, 1978; Lefton & Rosengren, 1966; Levine & White, 1961; Paulson, 1980; Thompson, 1967; Weinstein & Moravec, 1977). This approach is especially helpful when studying organizations that provide dissimilar services. To determine and categorize the principal services of each of a number of organizations providing dissimilar services would be extremely difficult and not necessarily any more accurate than a general assessment of technological intensity as measured by the extent to which organizational resources are devoted to any one client.

In general, the more intensive an agency's services to its clients, the more likely the professional staff will understand and recognize the full extent of client needs and problems. Few agencies are likely to be able to handle all of a client's problems except superficially (Paulson, 1980), and agencies that are able to develop a relatively full understanding of the nature and complexity of these problems (i.e., agencies providing more intensive services) are more likely to refer those of their clients with multiple problems to one or more additional organizations than are agencies whose involvement with and commitment to their clients tends to be more superficial (i.e., an extensive service technology).

Agencies that provide intensive services also are more likely than extensive service agencies to attract clients *from* other agencies. Intensive technology agencies experience a higher cost per client served than do those agencies with relatively extensive services. Thus, the staff of most agencies are more willing to refer clients to agencies already having intensive technologies than to incur the cost of attempting to serve these clients themselves. Agencies having relatively extensive service technologies are less likely to receive clients from other agencies because of the higher competition among agencies for attracting easily served, relatively low-cost clients. This argument is consistent with Scott's (1967) discussion of agencies serving the blind in New York City. Agencies attempted to attract those blind clients

that were most easily "cured" so that effectiveness could be readily demonstrated and future funding assured. For the organizations studied here, it thus seems likely that agencies serving more costly and difficult to "cure" clients (i.e., agencies with more intensive service technologies) would be more likely than extensive service technology agencies to receive referrals from other agencies that either cannot or are unwilling to provide more costly, intensive services. Thus, intensive service technology agencies are dependent on other organizations in their immediate environment both for attracting clients and for serving those of their clients with multiple problems.

Based on the preceding discussion, the following hypothesis is proposed:

Hypothesis 1: The more intensive an agency's service technology, the higher the proportion of its clients that are likely to be referrals from other agencies as well as to other agencies.

Interagency Activity. As an organization becomes involved with other organizations in its domain, it becomes increasingly dependent on these other organizations (Pfeffer & Salancik, 1978; Thompson & McEwen, 1958). One consequence of interdependence is that the effectiveness of all involved organizations becomes of greater concern to the members of the linkage network. Organizations are likely to help contribute to the success of those organizations with which they are involved because their own success may depend in part on the success of these other organizations. Often this means exchanging resources such as clients.

Pfeffer and Salancik (1978) speculate that referral networks would be unnecessary if there was no interdependence among organizations and that these networks would be unstable if interorganizational communication was weak. These points can be broadened to help predict the existence of resource exchanges among agencies through referrals. Specifically, it seems likely that referrals will occur when agencies are aware of and interact with one another in a cooperative way. This idea is consistent with Levine and White's (1961) contention that the exchange of resources such as referrals is most likely when organizations have relatively well-defined domains and thus are not competing with one another. Through cooperative interagency involvement, agencies are able to recognize and understand the problems they have in common and become more willing to work together toward the solution of these common problems. One such problem is the acquisition and service of clients, and agencies that are involved in a cooperative way with other organizations would seem likely to engage in referral activity with these other organizations as one means of facilitating client acquisition and service.

For agencies sharing joint programs, the likelihood of referrals seems especially strong because these agencies not only are aware of each other's activities, but they also are more committed to the success of their partners as a result of their interdependent activities. Additionally, an agency with a high level of interagency involvement is likely, as a result of communication with its linkage partners, to become aware of the programs and services of other agencies in the community to which it is not already linked,

thereby providing an additional outlet for its referrals as well as a future source of clients.

Through increased interagency communication and interdependence, agencies also become more visible in the client resource exchange network (Boje & Whetten, 1981). The visibility of an agency and its services enhances the likelihood of referrals from other agencies, even from those with which the focal agency is not otherwise linked. Also, as the focal agency becomes more aware of other agencies and their services through its own interagency involvement, it is more likely to refer its own clients to these other agencies. Thus it is likely that a high level of interagency activity will lead to a high level of referrals both to and from a focal agency.

For purposes of this study, two types of interagency activity are examined: interexecutive communication and joint program involvement. Interexecutive communication is a measure of strategic level interaction between agencies based on personal contact and covering a variety of issues. Interagency activity through joint programs represents a service-related linkage involving an agency's clients and professional staff. It also tends to be more formal and more difficult to alter over a short time period than interexecutive communication. Because these two measures reflect different aspects of the broad concept of interagency activity, two separate hypotheses are proposed and tested. Both express a positive association between interagency activity and client referrals.

Hypothesis 2: The higher the level of interexecutive communication experienced by an agency, the higher the proportion of its clients that are likely to be referrals from other organizations as well as to other organizations.

Hypothesis 3: The higher the level of programs experienced by an agency, the higher the proportion of its clients that are likely to be referrals from other organizations as well as to other organizations.

Measurement and Methods

Independent Variables

Service technology was measured using two variables. The first and most complex measure is the intensiveness of the agency-client contact. Each of the executives of the 41 human service agencies studied (a broad range of services was provided by this group of agencies) was asked to indicate the percentage of his/her clients that are typically served in each of seven possible time periods. Two measures were developed, one focusing on the length of contact per day, ranging from extensive ($1\frac{1}{2}$ hour or less) to intensive (more than 16 hours per day); and the other focusing on frequency of contact over the course of a year, ranging from extensive (once a year) to intensive (almost every day). These two dimensions were found to be highly correlated ($r = .61$, $p \leq .01$) and thus, after converting to Z-scores, were averaged to form a single measure of service technology.

The second measure of service technology is the number of service professionals per client. Service professionals are those agency professionals primarily engaged (at least 50 percent of their time) in service to clients rather than in administrative and supervisory duties. It was felt that use of all professionals would bias this measure because many professionals in some agencies spend little time with clients, thus reducing the level of intensiveness of the services provided.

The two measures of service technology developed here are related statistically ($r = .53, p \leq .01$) as well as conceptually. Thus they were standardized and combined into a 2-item service technology scale reflecting the overall intensiveness of services provided by each agency. Only this one measure of service technology will be used in subsequent analyses.

Interexecutive communication was measured by asking each executive director to approximate the number of hours over a typical month (200 hours) he or she spent "talking with the executive director of other agencies regarding agency concerns or problems."

Joint program involvement was measured in two ways: (1) the number of agencies and related organizations involved in the focal agency's joint programs, a measure of the extent of interagency contact through joint programs; and (2) the percentage of total agency clients involved in these joint programs, an indication of the extent to which joint programs pervade the agency's activities. Although used in other studies of human service agencies (Aiken & Hage, 1968; Provan, Beyer, & Kruytbosch, 1980), neither the actual number of joint programs maintained by an agency nor the number of joint programs as a percentage of an agency's total programs was used. The former measure was thought to be a function of agency size, and neither measure was deemed to be a good indicator of interagency activity because an agency having many joint programs might well be linked to only one or two other agencies. The two measures of joint program involvement that were used here are correlated strongly enough ($r = .44, p \leq .01$) to suggest important similarities but not strongly enough to warrant combining into a single measure of joint program activity. Interexecutive communication is weakly correlated with both of these measures ($r = .08$ for both) indicating two separate dimensions of interagency activity as suggested by the two hypotheses.

Dependent Variables: Referrals

When examining client referral activity, several decisions must be made as to how referrals should be studied. One decision is whether to focus on a narrowly defined referral network or to examine the referral activity of agencies without regard to their network affiliation. The latter approach was chosen here for two reasons. First, the focus here is on developing a general understanding of organizational characteristics related to referral activity. Because agencies involved in a narrowly defined referral network tend to be quite similar (Aldrich, 1976; Boje & Whetten, 1981), the generalizability of findings to networks of other types of agencies is likely to be

limited. Second, the referral activity of most human service agencies is simply not limited to one narrowly defined referral network unless referral activity is mandated by law. In most communities, although some clients are indeed referred among a small set of relatively similar agencies, many others are referred from and to a far more diverse and changing set of agencies. Many client problems simply do not fall into a few predetermined categories that can be handled by a small group of agencies providing related services performed in a preestablished sequence. Thus, the referral activity of most community human service agencies tends to involve a broad spectrum of human service organizations. For these reasons, no attempt was made to identify any referral networks other than the broadly defined community human service network to which all agencies studied belonged.

A second decision was whether to focus on absolute numbers of referrals or the proportion of referrals to total clients. Although the former measure has been used (Aldrich, 1976; Boje & Whetten, 1981), it tends to be a function of organization size, thus reducing its value in contributing to an understanding of those organizational characteristics most closely related to referral activity. For this reasons, referrals were measured here as a proportion of total clients served. This approach has been suggested by Van de Ven and Ferry (1980) as being helpful in minimizing possible response bias when seeking subjective assessments of resource flows.

Finally, the direction of referrals must be considered. In their study of referral centrality and attributed influence, Boje and Whetten (1981) focused on referrals *to* other organizations; attracting referrals was not problematic for the manpower agencies they studied. The study here attempts to develop an understanding of both sides of the referral process, thus both referral inflows and outflows are assessed.

Referrals were measured by asking the executive director of each agency to report the percentage of his or her agency's clients that were referrals *from* other agencies and related organizations and *to* other agencies and related organizations. Agency executive directors were chosen to respond to this and other questions because of their overall knowledge and understanding of agency operations as well as their access to agency records and other sources of information. This key informant approach to data collection has been suggested by Seidler (1974) and, despite some limitations, it has been used frequently, especially by researchers studying human service agencies (Boje & Whetten, 1981; Paulson, 1976; Provan et al., 1980; Rogers, 1974a, 1974b; Van de Ven & Ferry, 1980). The approach is particularly useful for studying human service agencies because the executive director is invariably the single most knowledgeable person regarding general agency operations and activities.

Boje and Whetten (1981) suggest that key informants are less useful when agencies are large because these persons have less complete knowledge of agency operations. In the study reported here, efforts were made to control for bias in this regard by encouraging the executive directors to consult with members of their staff if data were not known to them. As it turned out,

the larger of the agencies studied typically had more well-developed procedures for collecting data, thereby compensating for the reduced capacity of the executive director to have a personal knowledge of all agency activities. Follow-up telephone interviews to all agency executive directors gave no indication of any difficulty in responding to the questions on referrals.

The means and standard deviations of each of the two referral measures and the various independent variables are presented in Table 1. Table 1 also gives a correlation matrix of these variables.

Table 1
Means, Standard Deviations and Intercorrelation Matrix

	Mean	S.D.	1	2	3	4	5	6	7
<i>Independent variables</i>									
<i>Service technology:</i>									
1. Intensiveness of agency-client contact	.00	.90							
2. Service professionals per client	.02	.04	.53 ^a						
3. Service technology scale ^b	.00	.83	.86	.89					
<i>Interagency activity:</i>									
4. Interexecutive communication	7.41	7.12	-.04	.05	.01				
5. Number of organizations in joint programs	16.53	20.02	-.20	-.26	-.26	.08			
6. % of clients in joint programs	37.92	31.75	.25	.16	.23	.08	.44		
<i>Dependent variables</i>									
7. Referrals from other organizations (as a % of total clients)	36.24	31.72	.45	.52	.56	.00	-.35	.21	
8. Referrals to other organizations (as a % of total clients)	18.63	20.85	.35	.35	.40	.42	-.02	.05	.16

^a $N=41$; for $r \geq .20$, $p \leq .10$; for $r \geq .26$, $p \leq .05$; for $r \geq .34$, $p \leq .01$.

^bA scale consisting of the original two technology measures (nos. 1 and 2 above). Scale items were standardized before combining.

Sample and Data Collection

The organizations studied were a group of 41 human service agencies located in a medium-sized city in the northeastern United States. Taken collectively, the agencies provided a broad range of human services to the community, including various medical and physical information, treatment, and rehabilitation services, mental health counseling and rehabilitation, sheltered workshops, social services, recreation, and cultural and neighborhood development. Services were provided to clients of all ages and all ethnic and racial groups, although most clients tended to be relatively poor. Agencies ranged in size from quite small to quite large (total budgets ranged from less than \$100,000 to over \$4 million; median = \$605,600).

All of the agencies studied were affiliated with the United Way. No attempt was made here to focus specifically on agency-United Way relations, although United Way was one source of referrals for many agencies. United Way provides agencies with high legitimacy in the community and makes specific efforts to eliminate duplication of services. Because of these factors, United Way agencies tend to have relatively well-defined organizational

domains. As Levine and White (1961) have noted, organizations with well-defined domains are less likely to compete directly with one another. Competition is minimized, and agencies are more likely to engage in such cooperative activities as client exchanges through referrals. A second advantage was that a large amount of comparable data could be collected on the agencies studied. Human service agencies are notorious for maintaining few or poor-quality records. United Way affiliates, however, are required to maintain records on many aspects of their activities, thus minimizing potential data collection problems. A final reason for using United Way was that their agencies represent the broad spectrum of types of human service agencies

Table 2
Agencies and Their Scores on Referral Measures

<i>Agency^a</i>	<i>Referrals from Other Organizations^b Percent</i>	<i>Referrals to Other Organizations^b Percent</i>
1. Girl Scouts	0	1
2. Boy Scouts	1	1
3. Hemophilia Center	1	25
4. Jewish Community Center	1	1
5. Neighborhood Center	4	3
6. Catholic Youth Organization	5	5
7. Heart Association	5	18
8. Camp Fire Girls	5	5
9. Blind Association	10	40
10. Settlement House	10	10
11. Mental Health Center	10	5
12. Community Center	10	50
13. Jewish Family Services	10	10
14. Community Center	13	10
15. Family Services	15	5
16. Multiple Sclerosis	15	25
17. Settlement House	20	45
18. Ibero American League	20	20
19. Planned Parenthood	25	45
20. Urban League	30	20
21. YWCA	30	25
22. Catholic Family Center	30	20
23. Hearing and Speech Center	35	15
24. Music School	35	0
25. Legal Aid	35	10
26. Eye and Human Parts Bank	38	0
27. Center for Youth Services	40	20
28. Community Partners for Youth	45	20
29. Health Association	50	35
30. United Cancer Council	50	25
31. Cerebral Palsy Association	50	75
32. Council on Aging	50	5
33. Mental Health Clinic	65	10
34. Convalescent Hospital	75	5
35. Visiting Nurses	80	5
36. Medical Motor Service	90	0
37. Men's Service Center	90	25
38. Rehabilitation Center	90	5
39. Children's Center	97	10
40. Association for Retarded Citizens	100	10
41. Halfway House	100	100

^aSome agency names disguised to protect confidentiality.

^bReferrals expressed as an approximate percentage of total clients served.

found in most communities. Thus, strong findings might well be generalizable to other communities.

Of 47 regularly funded agencies affiliated with United Way, 41 agreed to participate fully in the study, a response rate of 87 percent. Data were collected in 1980 from United Way records, from agency records (provided by the executive director of the agency itself), and from the responses of agency executive directors and members of the staff of United Way obtained through questionnaires and interviews. A list of all agencies studied along with their scores on each referral measure is presented in Table 2.

Results and Discussion

From Table 1 it can be seen that the correlation between the two types of referral activity, although positive, is quite weak ($r = .16$, not significant). Apparently, referral activity for the agencies studied was not guided by norms of reciprocity such that agencies receiving a high proportion of clients through referrals would feel obliged to refer many of their clients and vice versa. This finding increases the importance of the results of testing the three hypotheses because it suggests that two separate models probably are needed for predicting each type of referral activity, with each of these models based on at least some different organizational characteristics. The three hypotheses were tested using Pearson zero-order correlations (Table 1) and multiple regression analysis. Primary discussion focuses on the multivariate results.

Table 3 presents the standardized regression coefficients for relationships between each of the two referral measures and all four agency characteristics that reflect the three hypotheses. Taken as a group, the four independent variables explain 34 percent of the variance in referrals from other organizations and 28 percent of the variance in referrals to other organizations

Table 3
Standardized Regression Coefficients for
Relationships Between Agency Characteristics and Referrals
(N = 41)

<i>Independent Variables: Agency Characteristics</i>	<i>Dependent Variables: Referrals</i>	
	<i>Referrals from Other Organizations</i>	<i>Referrals to Other Organizations</i>
Service technology (scale)	.40***	.47***
Interagency activity:		
Interexecutive communication	.00	.42***
Number of organizations in joint programs	-.37**	.14
% of clients in joint programs	.28*	-.15
Multiple R	.64***	.59***
R ²	.41	.35
Adjusted R ²	.34	.28

* $p \leq .10$

** $p \leq .05$

*** $p \leq .01$

using the adjusted R^2 statistics. Overall, these findings suggest the importance of the variables studied in explaining referrals both from and to other agencies. To test each of the hypotheses, however, it is necessary to examine the individual beta weights.

Hypothesis 1 (service technology) is strongly supported for both types of referral activity. Intensity of agency-client contact, the number of service professionals per client, and the composite service technology scale are all significantly and positively correlated with both dependent variables, as predicted ($p \leq .01$ for all correlations). Furthermore, when controlling for the other three independent variables, the beta weights for the service technology scale for both regression equations in Table 3 are statistically significant ($p \leq .01$) and in the direction hypothesized.

The findings related to the two hypotheses for interagency activity are mixed. As hypothesized, the percentage of an agency's clients involved in its joint programs is positively related to referrals from other organizations, particularly when controlling for the other independent variables (beta = .28, $p \leq .10$). However, a stronger finding is the negative relationship between the proportion of referrals from other organizations and the number of organizations linked to an agency through its joint programs (beta = -.37, $p \leq .05$). Correlations and beta weights expressing the relationship between interexecutive communication and referrals from other organizations are quite weak. Apparently, interagency activity is important for an agency in attracting referrals but only regarding joint program activity (as opposed to involvement through interexecutive communication regarding agency concerns and problems) and only if these joint programs actually involve a substantial proportion of the agency's clients.

When many organizations are involved in an agency's joint programs, the interdependencies among these organizations may be sufficiently diffused that the focal agency is not able to develop a strong enough relationship with any of these organizations to encourage them to refer clients to it; thus the strong negative relationship. It also may be that agencies with many interorganizational ties through joint programs provide more extensive services to clients and thus, consistent with Hypothesis 1, are less likely to receive referrals. When many agencies serve any one client, it is likely that fewer of these agencies will have as strong a commitment to the client as when only one or two agencies are involved. Agencies may devote fewer of their resources to any one client because their responsibilities to that client are shared by many other organizations. Thus, despite the potential of additional resources available to a client, the services of any one agency with many interorganization program linkages are likely to be rather extensive. This interpretation is given some support by the negative correlations found between the number of organizations involved in an agency's joint programs and the three measures of service technology; intensiveness of the agency-client contact ($r = -.20$, $p \leq .10$); service professionals per client ($r = -.26$, $p \leq .05$); and the service technology scale ($r = -.26$, $p \leq .05$).

The findings are somewhat less mixed regarding referrals to other organizations, although only one statistically significant beta weight emerged. As hypothesized, interexecutive communication is positively related to referrals to other organizations. Surprisingly, none of the two measures of joint program activity was found to be significantly related to referrals to other organizations when multiple regression was used, although the number of other organizations involved in an agency's joint programs was in the hypothesized direction. Apparently, joint program activity is relatively unimportant for an agency when referring clients to other organizations. It may be that the staff of agencies with a high level of joint program involvement with other organizations perceive less of a need to refer their clients to other agencies because their clients are already exposed to the services of a variety of organizations through one or more joint programs. Agencies whose executives communicate with other executives regarding agency concerns and problems do refer their clients to other agencies, perhaps because their clients do not already benefit from the services of many other organizations. This interpretation receives some support by the weak correlations between interexecutive communication and the number of organizations involved in an agency's joint programs ($r = .08$) and the percentage of clients involved in these programs ($r = .08$), suggesting that interexecutive communication is not necessarily based on joint program involvement.

Despite the cause-effect relationship suggested by the hypothesis, it may be that executives communicate with one another specifically because they refer clients to each other's agency and thus share common problems that need to be discussed. Additionally, it seems likely that the placement of clients with other organizations might require considerable communication with other agencies to determine a suitable recipient organization or to convince other organizations to accept an agency's clients. Such communication would be far less important for agencies when receiving clients from other organizations.

Despite some support for the hypotheses tested, it was thought that additional variance might still be explained by examining the agencies and their characteristics in a way that went beyond considering only those variables actually measured for the hypotheses. To do this, all 41 agencies were listed in order of their scores on each of the two dependent variables (see Table 2). Thus it was possible to see which specific agencies had few or a large proportion of their clients referred from and to other organizations. Once these two lists were obtained, agencies were painstakingly examined to determine if any characteristics not measured could be related to either type of referral activity. Some of these characteristics included the age of the agency's main client group; the relative mobility of clients; whether social, mental health, or physical health services were provided; whether services were inducting or noninducting (Bidwell & Vreeland, 1963); and the number of clients served by the agency. None of these factors seemed to be particularly helpful in explaining further agency referral activity.

One characteristic, however, was found to be extremely helpful in explaining referrals from, although not to, other organizations: service orientation. Agencies could be divided readily into two distinct categories depending on whether their services focused primarily on dealing with preventing and/or anticipating client problems, in which case its service orientation was said to be proactive; or coping with and/or curing problems that already existed for their clients, in which case the agency's service orientation was said to be reactive. Examples of proactive agencies are Boy and Girl Scouts and related agencies, all of the various community and neighborhood centers found in most cities, the "gym and swim" type agencies, and those physical and mental health agencies that focus primarily on prevention. These agencies deal mostly with "well" clients in the hopes that agency services will prevent future problems. Examples of reactive agencies include most mental and physical health-related agencies in which clients have specific problems that need to be addressed. Also included in this category are social service agencies that focus on particular client problems that already exist (for example, the Legal Aid Society).

Thought was given to viewing this variable as another dimension of technology intensiveness. However, the modest correlation between service orientation and the service technology scale ($r = .25, p \leq .06$), suggests that reactive agencies do not necessarily provide services that are highly intensive. In fact, the clients of some reactive agencies have problems that are readily resolved, and the clients of many proactive agencies often make substantial use of agency facilities and services over many years. The distinction made here is whether an agency's activities focus on serving essentially "well" clients or those with specific problems, regardless of how intensively the services are provided.

When examining the list of agencies rank ordered according to the proportion of clients referred from other organizations, 16 of the 22 agencies that scored in the low group on this variable (≤ 30 percent) were categorized as proactive. In contrast, only 2 of the agencies that scored in the high group (> 30 percent) on this referral variable were categorized as proactive,

Table 4
Relationship Between Service Orientation
and Referrals from Other Organizations
($N = 41$)

Service Orientation	Referrals from Other Organizations (as a % of Total Clients)	
	Low ($\leq 30\%$)	High ($> 30\%$)
Proactive	16 (1, 2, 4-8, 10, 12, 14, 17-22) ^a	2 ^b (24, 26)
Reactive	6 (3, 9, 11, 13, 15, 16)	17 (23, 25, 27-41)

^aSpecific agencies that fell into each cell. Numbers in parentheses correspond to the agency having that number in the rank ordering presented in Table 2 for referrals from other organizations.

^bThe probability of a cell having a value of 2 for $N = 41$ is less than .001 using the Fisher exact test.

and 17 were categorized as having a reactive service orientation. These findings are presented in Table 4. The strong results found when categorizing agencies by service orientation were not duplicated when agencies were rank ordered according to proportion of clients referred to other organizations. In fact, no other agency characteristics were found to be helpful in explaining this particular referral measure.

To examine more rigorously the impact of service orientation on referral activity, the multiple regression analysis presented in Table 3 was rerun, this time adding service orientation as a fifth independent variable. To do this, all proactive agencies were assigned a value of 0, and all reactive agencies were scored as 1. Thus a significantly positive beta weight for service orientation would indicate that referral activity would be more closely associated with reactive rather than proactive agencies. Findings are reported in Table 5.

Table 5
Standardized Regression Coefficients for
Relationships Between Five Agency Characteristics and Referrals
(N = 41)

<i>Independent Variables: Agency Characteristics</i>	<i>Dependent Variables: Referrals</i>	
	<i>Referrals from Other Organizations</i>	<i>Referrals to Other Organizations</i>
Service technology (scale)	.37***	.46***
Interagency activity:		
Interexecutive communication	.01	.42***
Number of organizations in joint programs	-.21**	.19
% of clients in joint programs	.12*	-.20
Service orientation ^a	.41***	.12
	(<i>r</i> = .58***)	(<i>r</i> = .14)
Multiple <i>R</i>	.74***	.60***
<i>R</i> ²	.54	.37
Adjusted <i>R</i> ²	.48	.27

^aA positive beta weight indicates that reactive agencies are more likely than proactive ones to be associated with a high level of a particular type of referral activity.

**p* ≤ .10

***p* ≤ .05

****p* ≤ .01

The regression results give strong support for the tentative conclusions made from Table 4. Even when controlling for the effects of the other four variables in the equation, reactive agencies were found to be strongly related to referrals from other organizations (beta = .41, *p* ≤ .01; *r* = .58, *p* ≤ .01). Additionally, the amount of variance in referrals from other organizations explained by the independent variables included in the regression equation increased from 34 to 48 percent (adjusted *R*²) when service orientation was added. The change in multiple correlation from .64 to .74 is statistically significant (*p* ≤ .01). Beta weights for the two measures of interagency activity related to joint programs were no longer statistically significant although service technology remained a strong predictor of referral inflows.

In retrospect, the positive finding for service orientation is not surprising. Reactive agencies provide specific services to clients with specific problems.

Schools, local physicians, general hospitals, general service agencies such as United Way and local government welfare agencies, and even some proactive service goal agencies regularly encounter clients with particular problems that they cannot serve themselves. These organizations are likely to know which agencies in a community provide services that fit the needs of these clients and to refer them to these reactive service agencies. Proactive agencies, on the other hand, provide services that often are based on broad and rather vaguely defined goals, thus reducing the likelihood that another organization would specify that agency as one that might be helpful for a client. Proactive agencies are far more likely to attract walk-in clients; their services are potentially attractive to a broad spectrum of the population of a community. Also, these agencies tend to engage in specific programs to increase the general public's awareness of the activities they provide, thereby attracting clients. This is less likely for reactive agencies, the focus of which is on a more well-defined but often difficult to locate potential client group.

The weak relationship between service goal orientation and referrals to other organizations is somewhat surprising, although a reasonable explanation can be made. Service orientation is modestly correlated with the service technology scale ($r = .25, p \leq .06$) developed for Hypothesis 1. Consistent with this hypothesis, it therefore might be argued that reactive agencies, because of a sharper awareness of the problems of their clients, would refer more of their clients to other organizations (if these clients could not be served in-house) than would proactive agencies. However, a number of proactive agencies also refer their clients to other organizations (see Table 2), perhaps because of a recognition that their own rather general services are insufficient for some clients. The existence of this second and contradictory trend certainly would have a moderating effect on any positive relationship between service orientation and referral outflows and could well explain the weak findings reported in Table 5.

Summary and Conclusion

This study has examined the relationship between several organizational characteristics and client referrals among human service agencies in a community. The hypothesis based on service technology was fully supported; the two hypotheses based on interagency activity received only mixed support. More specifically, agencies having a high proportion of their clients referred from other organizations were found to have intensive service technologies, a high proportion of their clients involved in joint programs with other agencies, and relatively few organizations involved with the agency in its joint programs. Agencies that referred a high proportion of their clients to other organizations were found to have intensive service technologies and a high level of interexecutive communication. When agencies were examined further in a more micro-analytic way, service orientation emerged as

an important predictor of referrals from other organizations, although the finding for referrals to other organizations was weak.

Despite the fact that all the hypotheses proposed were not fully supported, the overall results for each of the final two regression equations (Table 5) were quite strong. Thus, the findings from this study have been illuminating in explaining an underresearched aspect of the broad area of resource flows among organizations. From these data it is possible to make some tentative conclusions as to why human service agencies are likely to engage in each of the two types of referral activities.

One conclusion is that the flow of clients to an agency through referrals seems to be a function of internal organizational factors related to the processing of clients served. Specifically, a high level of referral inflows is likely for reactive agencies and those providing intensive services to their clients. What this suggests is that a relatively high proportion of clients served by most mental and physical health care and rehabilitation agencies will be referrals from other organizations in the community. The results of this study do not suggest who sends clients to these agencies, although the idea of a heterogeneous referral network was stressed, implying that referrals would not be limited to agencies with similar goals.

The strongest individual predictor of referral outflows was service technology, demonstrating the importance of this one agency characteristic for explaining both types of referral activity. However, referrals to other organizations also were predicted quite strongly by interexecutive communication, a finding that did not occur when focusing on referral inflows. Consistent with resource-dependence and instrumentality (Whetten & Leung, 1979) theories, a conscious decision can be made by agency management to send clients to other organizations, and the decision no doubt will be made if it is viewed as helpful to the agency's overall effectiveness. However, based on the findings reported here, it is possible to conclude that actual client outflows are likely to depend first on the agency's capacity to identify referable clients (based on the intensiveness of its service technology) and secondly by the willingness of other agencies to accept these clients, a condition that may be favorably altered through increased communication with the executives of other agencies.

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Divestiture, Market Valuation, and Strategy

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An empirical study of 78 divestitures examines the relationship between type of divestiture and financial market valuation. It was found that divestitures linked to corporate or business level strategies in company publications were valued positively by the market; divestitures portrayed as the sale of unwanted units in the absence of defined strategic goals were valued negatively.

The option of corporate divestiture has gained prominence recently. The business press has written of divestiture as a major tool for asset redeployment ("American Divestment," 1981; "Asset Redeployment," 1981; "Divestitures," 1981). Academic researchers have investigated the reasons behind divestiture (Duhaime, 1981; Gilmour, 1973) and are beginning to assess the financial outcomes of divestiture moves (Boudreaux, 1975; Kummer, 1978; Magiera & Grunewald, 1978). Popular consulting approaches, particularly those dealing with the portfolio-management approach, have emphasized the importance of viewing divestiture as a legitimate management option. Each of these sources has influenced the development of the present paper.

Arising from the work mentioned above, the present study's primary focus is on the financial impact of divestitures and the strategic characteristics that tend to accompany positive or negative valuation. Two questions guided the study:

1. How does the financial market value divestitures?
2. Are certain kinds of divestitures valued more favorably than other kinds of divestitures?

The salience of these issues was noted by Duhaime when she reported, based on interviews with corporate executives, that "stock price was the most frequently mentioned firm-level financial issue affecting divestment decisions" (1981, p. 174).

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Strategy and Divestiture

The concept of corporate strategy has been widely discussed in the policy literature, and the plea for proactive and carefully integrated corporate actions has been made repeatedly (Andrews, 1980; Chandler, 1962; Christensen, Andrews, & Bower, 1978). The principal premise behind this work is that deliberate evaluation of alternatives and explicit matching between the firm's resources and environmental opportunities are more likely to increase long term returns than unreflective or reactive responses to environmental events. The policy work also emphasizes the importance of multidimensional evaluation, stressing not only financial performance but long run "fit" and competitive issues as well.

The literature referenced above suggests that divestiture decisions, like other major management decisions, should be rooted in corporate strategy. Writing on divestiture, Hayes (1972), Porter (1976), and Harrigan (1981) have made this argument explicit. The policy work implies that voluntary divestitures that are part of clearly identified strategies should create more value than divestitures that take place in a reactionary or piecemeal manner or divestitures arising from unidimensional or short term performance criteria. Although researchers in the field of finance have examined the effects of divestitures on firm value, they have not considered the role that strategy plays in divestitures and value creation.

Market Response to Divestiture Announcements

Researchers in the field of finance recently have begun to explore the capital market's reaction to divestiture moves. Related to work on mergers, the research has applied capital market theory to the valuation of divestitures. The theory argues that, like any other major decision a firm makes, voluntary divestitures should take place only when the expected income stream associated with or following a divestiture is greater than the expected income stream of continued operation. Only in this circumstance is it in the shareholders' best interest to have the unit sold.

With this theoretical basis, researchers have demonstrated empirically that voluntary divestitures generally are valued positively by the market (Boudreaux, 1975; Magiera & Grunewald, 1978) and FTC-forced divestitures (involuntary) are not (Boudreaux, 1975; Kummer, 1978; Magiera & Grunewald, 1978). These results are consistent with expectations based on capital market theory. In addition, Magiera and Grunewald (1978) attempted to differentiate between two types of voluntary divestitures—those undertaken for change-of-business-mix motives and those undertaken for poor financial circumstances at the business or firm level. This disaggregation was not supported with a theoretical framework, and it was not clear why the authors expected valuation to differ across these categories. Not surprisingly, the results were inconclusive.

The studies referenced above used residual analysis to examine the market impact of divestitures. Residual analysis, a technique commonly employed to isolate abnormal returns associated with particular events, is based on a market model described by Fama (1976). The model predicts a firm's "normal" or expected return, given the market return (a control for exogenous events) and the firm's historical relationship to the market:

$$\gamma_j = \alpha_j + \beta_j \gamma_m + \epsilon_j \quad (1)$$

where γ_j = return on security j

α_j = intercept term for security j

β_j = historic market relationship for security j

γ_m = market return (value weighted, including dividends)

ϵ_j = error term

Historic parameters α_j and β_j are estimated for each security j over a period prior to the test period. These parameters then are used to calculate the expected returns over the test period. The difference between the actual returns and the expected returns for each of the time periods forms the series of abnormal returns that are examined in relationship to the divestiture events:

$$r_{jt} = \gamma_{jt} - (\alpha_j + \beta_j \gamma_{mt}) \quad (2)$$

where r_{jt} = abnormal return to security j in period t .

The abnormal returns then are cumulated across time:

$$CAR_{KL} = \sum_{t=K}^L r_{jt}$$

where $K = t - 12$

$K < L \leq t + 12$.

(3)

Repeated calculations of CAR_{KL} for different values of L provide a series of cumulative abnormal returns that can be averaged across groups.

Sample and Methods

Sample Composition

The study's sample consists of divestitures made by *Fortune* 500 firms and announced in the *Wall Street Journal* during the years 1976-1979: 1976 follows the major recessionary period that began in 1973, and the 1976-1979 frame is reasonably free of widespread anomalies that could be introduced by severe economic conditions. In addition, the following information had to be available for a divestiture to be included in the sample:

1. A stated dollar value for the divestiture. This criterion was introduced to control for the potential influence of divestiture size on return patterns and strategy classifications.
2. Monthly stock market returns for the divesting firm's stock. These data are taken from the Center for Research in Security Prices (CRSP) tapes that are available from the University of Chicago.

Fortune 500 firms announced the completion of 485 divestitures in the *Wall Street Journal* during the 1976-1979 period; 90 fulfilled the information requirements. Of these, 12 were eliminated because firms made multiple divestitures that resulted in overlapping test periods. The remaining 78 divestitures constitute the study sample. Examined for additional data on divestiture transaction values were 8-K filings, which record divestiture data for the SEC. However, the SEC requires an 8-K to be filed only in cases in which 10 percent or more of a firm's assets have been sold. That requirement was met in less than 10 percent of announced divestitures, and the *Journal* proved to be a reliable and more efficient source of data on these and other divestitures.

Category Development

To gain an overview of divestiture motives, data were gathered by the authors from annual reports and 10-K filings. Firm level data included corporate history, product mix, and statements on overall firm strategy when available. Data relating to divestitures, when available, included the competitive and financial history of the unit, its linkage to the rest of the corporation, and the stated reasons for divestiture. In studying these data en masse, four motives for divestiture become apparent (sample descriptions from company publications are given in italics):

1. *Strategic Divestiture.* A divestiture related to corporate or business level strategy, evidenced through specific discussion of the divestiture and its impact on the way the firm does business. These divestitures often included decisions to exit an industry, to move away from or toward "core" businesses, or to realign a firm's product mix within a given industry. For example:

The sale of X Division will permit the company to devote all of its resources to business information processing systems and directly related products and services.

X is America's leading producer of cement, concrete, sand and gravel, and a major producer of crushed stone and precast products. In 1979, we acted boldly to focus our resources and energies on these products. . . . corporate strategy has been redirected. . . . building centers were sold, realizing 152M to accelerate growth in cement, aggregates and related products.

2. *Selling Undesired Units.* Divestitures presented in a housecleaning fashion as a means of ridding the firm of unwanted units. These divestitures were not linked to specific strategic aims in company publications, were often described only in financial terms, and appeared to be divested without affecting the integrity or direction of the firm as a whole. For example:

Took the following steps with respect to marginal operation. . .

Two product lines that have not been meeting these standards (growth and ROI criteria) have been sold.

3. Selling in Response to Liquidity Concerns. Divestitures made in response to severe corporate liquidity problems—bankruptcies, near bankruptcies, or extended period of loss. In some cases these defensive divestitures constitute major strategic shifts, yet were distinguished from Category 1 by the severe financial circumstances surrounding the divestitures. For example:

100% of the net proceeds which are realized as a result of the disposition of the assets of the X Group must be paid to those banks which are party to the company's Restated and Amended Pledge Agreement.

2 1/2 years ago our management began a major restructuring program aimed at halting a 5 year decline in earnings. . . . During the year X further consolidated its operations. . . .

4. Forced Divestitures. Divestitures pressed by federal agencies. These included divestitures relating to FTC requirements and divestitures forced by the Canadian government in industries related to national security. For example:

Most of the assets and liabilities of the X company were sold. Our company acquired X in 1969 and a subsequent challenge by the FTC resulted in a consent agreement providing for divestiture.

The sale was done at the request of the Canadian Government to further its policy of having all major Canadian aerospace companies owned by Canadians.

5. Undiscussed Divestitures. Divestitures on which companies did not comment. Though the divestitures were reported in the *Wall Street Journal*, the companies making the divestitures did not discuss the moves in their annual reports or 10-K filings.

These classification categories are, by definition, subjective. Attempts first were made to establish "objective" classification criteria, such as percentage change in business mix. Yet it soon became apparent that across firms, the criteria were not capturing strategic significance as portrayed by management. In contrast, these five categories clearly and consistently emerged from the data.

Category Assignments

Each divestiture then was assigned to one of the divestiture categories. To accomplish this, data sets on each event were compiled and given to each author for classification. Next, the group met, discussed each divestiture, and assigned classification by consensus. This process was necessarily judgmental and was based on the information available. It appeared to be the most valid approach to the issues at hand.

Financial Calculations

Monthly rather than daily returns were used to track the market response because the exact time that divestiture information reaches the market is rarely known precisely. For each security j , the coefficients α_j and β_j were estimated, using returns over a 5-year period prior to the test period ($t - 72$ to $t - 13$ where $t = 0$ is the month of announcement). Expected returns were calculated and then compared to actual returns over the $t - 12$ to $t + 12$ test

period. The differences between the actual returns and the expected returns formed a series of abnormal returns that then were cumulated across time.

Empirical Tests

Using these categorical assignments and financial calculations, the hypotheses were operationalized as follows. First, it was expected that the divestitures classified as strategic (Category 1) would be associated with positive abnormal returns. These divestitures represent proactive integrated managerial decisions that should be in the best interests of the shareholders. Similarly, category 2 divestitures (sale of undesired units) were expected to be valued positively, although not as highly as those in category 1. Although these divestitures portray a narrower perspective, they too should be undertaken with the interest of shareholders in mind.

Consistent with previous empirical work (Kummer, 1978; Magiera & Grunewald, 1978), it was expected that divestitures forced by external agencies (category 4) would be valued negatively. These actions are not freely undertaken by management and therefore are not necessarily in the shareholders' best interests. The effects of the events in category 3 (selling in response to liquidity concerns) were more difficult to predict. In some ways this type of divestiture is similar to that in category 4 in that both types of divestitures are forced by adverse circumstances. On the other hand, the events in category 3 might represent positive actions that would signal turnaround situations.

The possibility exists that divestiture type or financial outcome varies by size of divestiture. If it is the case, for instance, that "strategic" divestitures are of larger-than-average size, and if the market effect is a function of size, then size could be attenuating or confounding the study's results. To address this issue divestiture size was examined in relationship to strategy category and financial outcome.

Empirical Results

Total Sample

Figure 1 shows the plot of cumulative residuals surrounding 78 divestiture announcements. As expected, the overall trend is upward following the date of announcement. Prior to announcement the residuals wavered marginally between +1 and -1 percent. This result suggests that, overall, the market did value divestitures positively.

Analysis by Category

Table 1 gives an analysis of variance for the market performance as measured by final cumulative abnormal returns (CARs) across the divestiture categories. The level of significance of the *F*-test, .0439, indicates that the

Figure 1
Cumulative Abnormal Returns to the Portfolio of 78 Divesting Firms

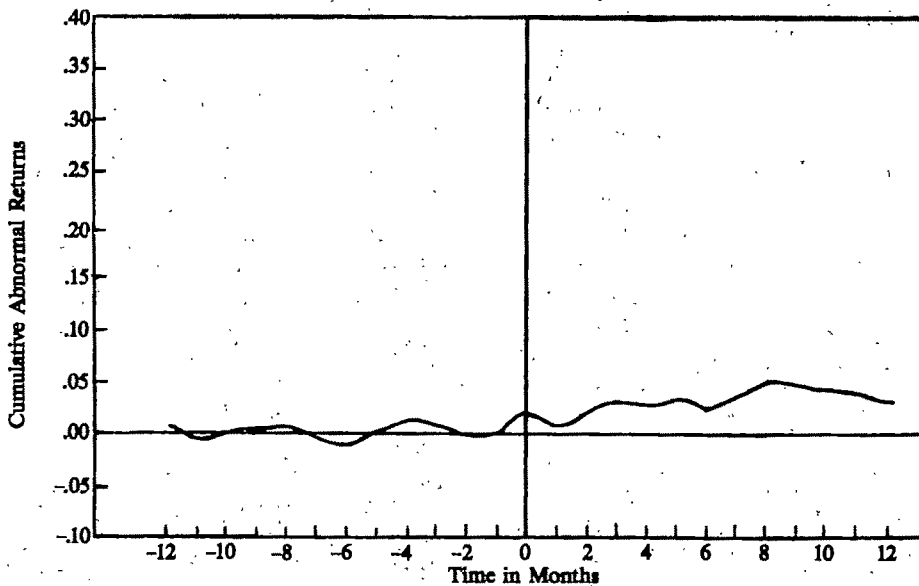


Table 1
Cumulative Abnormal Returns (CARs) by Strategy Category

Source	DF	Sum of Squares	Analysis of Variance		
			Mean Square	F Statistic	Significance
Between	4	3.1391	.78478	2.5858	.0439
Within	73	22.155	.30350		
Total	77	25.294			

Strategy Category	N	Mean	Significance of one-tail t-test ^a
(1) Strategic divestiture	21	.34531	$p < .001$
(2) Selling of undesired units	26	-.09125	$p = .07$
(3) Response to liquidity concerns	10	.25686	$p = .15$
(4) Forced divestitures	6	-.01870	$p = .95$
(5) Undiscussed divestitures	15	-.10811	$p = .15$
Grand	78	.07251	$p = .08$

^at-tests on CARs were calculated as follows: $\frac{CAR_{-12,12}}{\sqrt{N\sigma(AR)_{-12,12}}}$ where $N=25$.

null hypothesis—all factor level means are equal—was rejected. Pairwise comparisons detailing the differences among category groups are given in Table 2. The most significant pairwise difference in cumulative abnormal returns is between categories 1 and 2.

As expected, category 1 divestitures linked to corporate or business level strategy were valued positively by the market. Quite in contrast, divestitures that were presented as a sale of undesired units (category 2) were valued

Table 2
Pairwise Comparison of Cumulative Average Returns
Between Divestiture Categories
(Level of Significance)

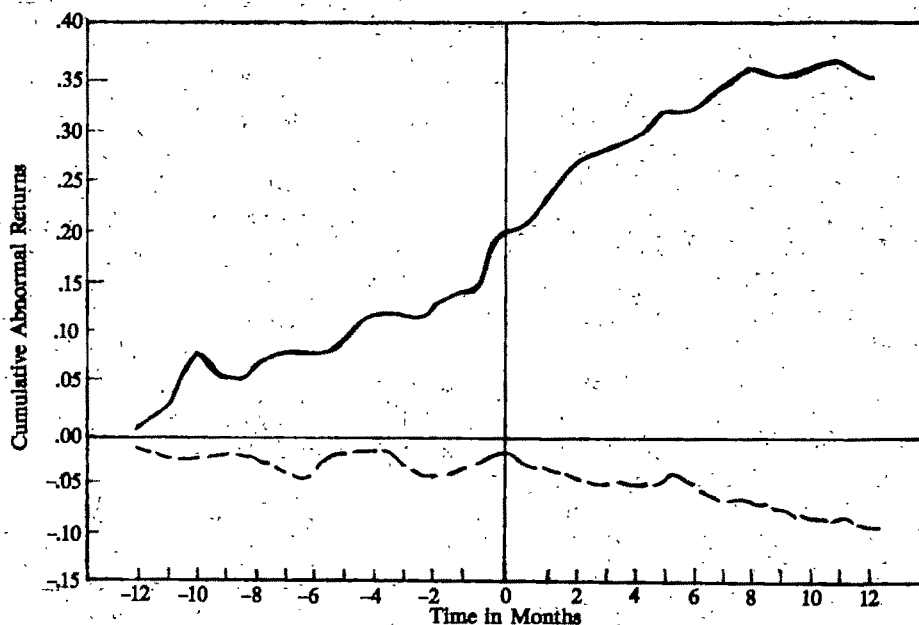
Strategy Category ^a	1 n=21	2 n=26	3 n=10	4 n=6	5 n=15
1	—	.0086	.6773	.1577	.0174
2		—	.0937	.7720	.9271
3			—	.3359	.1090
4				—	.7379

^a1= strategic divestiture; 2=selling of undesired units; 3=response to liquidity concerns; 4=forced divestitures; 5=undiscussed divestitures.

negatively by the market. Although it was hypothesized that category 2 divestitures would be valued less positively than category 1 divestitures, the negative valuation of these events was not anticipated.

The patterns of cumulative average returns over the total test period for categories 1 and 2 are shown in Figure 2. Note that the trend deviations begin before the dates of announcement ($t=0$). This phenomenon likely reflects imprecision about the date some pieces of information reached the market. The strong early trend of category 1 firms also could indicate that

Figure 2
Cumulative Abnormal Returns to the Portfolios of
21 "Strategic" and 26 "Unwanted Unit" Divestitures



— "Strategic" (Category 1)
 - - - "Unwanted Unit" (Category 2)

these divestitures provided additional certainty about strategies that had been stated earlier.

Divestitures in category 3, selling in response to liquidity concerns, also had positive abnormal returns, though the mean cumulative return was significantly different from zero only at the .15 level. This category's large standard deviation likely reflects the unusual character of these firms' troubled times. Category 4, forced divestitures, were valued negatively, yet the distance from zero was not significant. The small sample size or uncertainty relating to the time the divestiture information reached the market (Kummer, 1978) could account for this result. Category 5, divestitures for which no motives were stated, also appear to be valued negatively. This result suggests that this set of firms is not a representative sample of categories 1 through 4, but may be a set of problem divestitures about which management was withholding comments.

Divestiture size defined both in dollar value of transaction and in dollar value of transaction relative to total assets of the firm was compared across divestiture categories. It was found that category 1 divestitures measured relative to total assets (though not in actual dollar terms) were on average larger than the divestitures of other groups. A simple correlation between size and market returns was positive, but not statistically significant ($p = .27$). When included in a multivariate analysis with category dummies, size again was not significant ($p = .75$). Thus, though category 1 divestitures are larger than those in other categories (median ratio of transaction value to total assets for category 1 was .041; median value for other categories was .021), the evidence indicates that the market effects are not related to transaction size.

Conclusions and Implications

The results of this study offer insights into the linkage between corporate strategy and financial valuation. Among the five categories of divestiture that were identified in the study, two were found to be associated with significant changes in share value. As was expected, divestitures that were part of integrated, strategic plans exhibited large positive stock market effects. In contrast, the group of routine, nonstrategic divestitures was associated with negative stock price effects. The latter results were not expected. The remaining categories of divestitures, including those undertaken because of liquidity needs, government pressure, or unstated reasons, exhibited non-significant changes in stock prices.

The positive valuation of divestitures linked to strategy is consistent with the view that divestiture can be a sound and legitimate management tool. Furthermore, these results strongly support the views of management writers who stress that divestiture decisions should be grounded in careful strategic analysis that links the unit in question to broader firm goals. Under these conditions, divestitures are associated with value creation.

However, the study raises a caution flag about another kind of divestiture. Those sell-offs that were treated as arms-length financial transactions without further linkage to corporate mission or plans were valued negatively by the market. This means that these divestitures were viewed as value destroying, not value creating. More explicitly, this result indicates that these actions were not accepted as being in the best interests of the firms' shareholders. Why might this be the case?

Porter (1976) and Harrigan (1981) have written about structural, strategic, and managerial exit barriers that can delay exit decisions and increase the difficulty of retrieving the value of assets in divestiture. Hence, in the presence of exit barriers, divestitures can result in a decline in firm value. Even less tangible than exit barriers that can reduce divestiture proceeds are the subtle costs of disuniting. These factors include emotional issues, such as employee morale and face saving, and administrative transaction costs surrounding separation. Although Nees (1981) suggested that greater involvement of management in the divested units may ease these burdens, the issues remain troublesome and could be operating here. At a minimum, this work suggests that in the absence of clear positives, divestitures can be costly events. These results indicate that the simply expressed adage to "sell off dogs" may not always be prudent advice.

The study's dependence on publicly available company documents raises some additional research issues. Discussion of divestitures in these publications is likely to reflect a degree of public relations efforts as well as substantive data on divestiture activity. The possible confounding influence of management's willingness and style of presentation goes beyond this study to the market's receipt and evaluation of information. What is fact and what is rhetoric can never be declared decisively. However, the study's strong results indicate that the market does value positively divestitures that are linked to corporate strategy in company publications.

At the center of this study's design is the issue of linking management action (and the prescription for the same) with perceived shareholder benefit. The work shows that the market response to divestitures is complex and heterogeneous, and that the phenomenon should not be viewed in isolation of other firm activity. Additional work is necessary to untangle the intricate positives and negatives of divestiture activity.

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Contextual and Strategic Differences Among Mature Businesses in Four Dynamic Performance Situations¹

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Recent empirical studies have presented evidence that contradicts the presumed trade-off between changes in market share and profitability. This research attempted to resolve these inconsistent findings and to examine the conditions under which simultaneous increases in market share and profitability are found. Contextual and strategic differences were identified among businesses in four dynamic performance situations.

The relationship between market share and profitability has been an important and controversial issue in the business strategy literature. Initial empirical research on the topic (Boston Consulting Group, 1974; Buzzell, Gale, & Sultan, 1975; Chevalier, 1972; Fruhan, 1972; Schoeffler, Buzzell, & Heany, 1974) found a significant positive correlation between market share and return on investment (ROI). This relationship received support from related research in industrial organization economics (Gale, 1972; Jones, Laudadio, & Percy, 1977; Qualls, 1974; Scherer, 1980; Shepherd, 1972; Vernon, 1972; Weiss, 1974), in which significant positive associations were found between industry concentration and profitability. Explanations of this relationship emphasized market share advantages related to economies of scale, market power over suppliers and distributors, quality of management, and brand name recognition. Although several authors (Bloom & Kotler, 1975; Buzzell

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et al., 1975) cautioned researchers and practitioners concerning the interpretation and application of these statistical relationships, the popular wisdom for several years advocated the implementation of strategies designed to increase market share as a means to improve profitability.

An important corollary to this relationship, however, suggested a short term trade-off between these variables. The analysis conducted by Buzzell et al. (1975) indicated that the average ROI of businesses building market share was generally lower than the average ROI of businesses with stable shares and, in some cases, businesses with declining shares. Once again, the common interpretation was that a short term reduction in profits and negative cash flows were to be expected with the strategic investments required for market share growth, but that long term profits resulting from these investments would justify such reductions.

Recently, several empirical studies have questioned the validity of these imperatives. Rumelt and Wensley (1981), Woo (1983), and Woo and Cooper (1981) have objected strongly to the presumed causal relationship between market share and profitability. They have demonstrated that low share can be profitable and that high share does not guarantee high ROI. Furthermore, additional research (Hambrick, MacMillan, & Day, 1982; Hambrick & Schecter, 1983) has suggested that market share gains are compatible with sustained or increased levels of profitability. These findings conflict with previous research, therefore, on two issues: (1) the value and impact of market share and (2) the possibility of simultaneous increases in market share and profits. Each issue has significant implications for business level objectives and strategies.

Because it has received minimal attention, the present research focused primarily on the second issue. The purpose of the study was to contribute to a resolution of the apparent contradiction in the literature concerning simultaneous changes in market share and profitability. A typology of four dynamic performance situations was constructed, each situation with its own combination of changes in market share and profitability; and contextual and strategic differences among businesses in the four contrasting settings were identified.

Selected Conceptual and Empirical Antecedents

Based on the initial market share-profitability findings, various authors developed sets of strategies to pursue market share or profitability objectives. Each strategy was designed primarily to achieve an increase in one performance objective or the other, at least in the short term. For example, Buzzell et al. (1975) outlined three groups of strategies: building strategies, holding strategies, and harvesting strategies. Hofer and Schendel (1978) discussed six generic strategies, including share increasing strategies, growth strategies, profit strategies, market concentration strategies, turnaround strategies, and liquidation and divestiture strategies. Building or share increasing strategies emphasize activities designed to increase market share,

even at the expense of short term profits. Holding or profit strategies are aimed at the profitable maintenance of existing market share levels. Harvesting strategies allow market share to decline in order to achieve higher short term earnings and are commonly used in liquidation situations. Most discussions of these strategies advocate the use of the contingency approach, making their implementation contingent on factors such as the stage of the product life cycle or existing market share.

In the last few years, theory and research relevant to the market share-profitability issue have taken at least two, somewhat different, paths. First, several empirical studies (Anderson & Zeithaml, 1984; Buzzell, 1983; Buzzell & Wiersema, 1981; Hall, 1980; Hambrick, 1983; MacMillan, Hambrick, & Day, 1982) have attempted to determine strategies associated with profitability or market share in various situations. These studies assumed either a trade-off between profitability and market share increases or that different sets of strategic variables were associated with ROI, market share, and changes in market share. With the exceptions of the Anderson and Zeithaml (1984) and Hambrick (1983) studies, this research focused primarily on a single performance variable. Although a strict analytical comparison was not made, Anderson and Zeithaml (1984) observed some overlap between the strategies associated with ROI and relative market share.

The second research stream reexamined, sometimes indirectly, the association between profitability and market share and the presumed trade-off between changes in market share and profitability. In particular, six studies provided the foundation for this project. In each study, a somewhat different approach was taken to the treatment of market share and profitability, primarily with respect to their use as static or dynamic variables.

Rumelt and Wensley (1981) empirically investigated the causal structure underlying the association between market share and profitability. They concluded that the intrinsic value of market share had been grossly overstated and that, in itself, market share is not a valid strategic goal. Furthermore, using both static and dynamic measures of market share and ROI, they found that increases in market share were associated with concurrent increases in the rate of return.

Woo (1983) compared a sample of high ROI versus low ROI market leaders on a variety of contextual and strategic characteristics. The study primarily employed static measures of ROI and market share to define the sample, and it concentrated on businesses following essentially a holding strategy as opposed to building or harvesting strategies. Woo concluded that market share does not always translate into profitability. The profitability of a high share strategy depends on other variables such as market stability, demand characteristics, and competitive posture.

Hambrick et al. (1982) examined differences in the performance tendencies and strategic attributes of businesses across the four cells of the Boston Consulting Group (BCG) portfolio matrix. Although they reported that high share businesses had higher ROI levels than low share businesses, they also found no significant correlations between ROI and market share change,

suggesting that a trade-off may not always exist. The researchers questioned whether managers should be relieved of profitability goals as they attempt to gain share.

Fry and Zeithaml (1982) studied the strategies of profitable and unprofitable firms experiencing changes in market share. They found that businesses may not need to sacrifice above-average profits for substantial market share gains. Consistent with Hall (1980), profitable, increasing share firms appeared to differentiate their products while maintaining relatively low levels of costs and investments. However, ROI was treated as a static performance measure, and comparisons were restricted to a limited number of strategic variables.

Phillips, Chang, and Buzzell (1983) used a causal modeling methodology to examine competing hypotheses concerning the effects of product quality on direct costs and ROI. They found that cost leadership strategies and product quality-based differentiation strategies were both viable routes to superior profitability, and that these sets of strategies were not necessarily incompatible. Furthermore, product quality had a favorable, yet indirect, influence on ROI through its positive effects on market position. Product quality also exerted a beneficial effect on relative direct costs through improved market share. Although this study was not specifically concerned with the dynamic market share-profitability trade-off, it suggests that certain competitive strategies allow businesses to strengthen market position and command higher profit margins, thereby improving ROI.

Finally, in a study of short term turnaround attempts among mature businesses, Hambrick and Schecter (1983) found that increases in market share were positively related to increases in ROI, indicating that market share and profitability at times can be pursued in tandem. Although they found that improved profits were associated with efficiency, the research failed to uncover how market share increases are achieved. In keeping with its purpose, the study also focused on a restricted sample of businesses.

Research Framework

The studies outlined above suggest that concurrent increases in profitability and market share are possible. This conclusion seems to conflict with previous research and conventional wisdom concerning the market share-profitability trade-off. Unfortunately, the more recent findings provide limited empirical evidence to explain this inconsistency. The purpose of this study, therefore, was to investigate this apparent contradiction, exploring concurrent changes in market share and profitability through an examination of the contextual and strategic differences between:

- (1) businesses realizing simultaneous increases in market share and profitability,
- (2) businesses sacrificing market share to secure increases in profitability,
- (3) businesses building market share at the expense of profitability, and
- (4) businesses confronting declines in both performance measures.

Figure 1
Research Framework, Descriptive Statistics,
Dynamic Performance Situations

		Change in Relative Market Share (Δ RMS)			
		Increasing	+1	-1	Decreasing
Change in Profitability (Δ ROI)	Increasing	I. Superstars $n = 106$ Δ RMS = 6.26 (6.97) Δ ROI = 10.21 (5.99)		II. Harvesters $n = 52$ Δ RMS = -10.52 (14.25) Δ ROI = 7.04 (3.24)	
	+3				
	-3				
	Decreasing	III. Builders $n = 52$ Δ RMS = 7.57 (8.43) Δ ROI = -8.22 (3.63)		IV. Decliners $n = 84$ Δ RMS = -11.15 (14.26) Δ ROI = -8.62 (4.06)	

These four dynamic performance situations, therefore, constituted the research settings for the study. They are summarized in Figure 1. Cell I businesses, referred to as "superstars," have registered substantial increases in both market share and profitability. Cell II businesses, "harvesters," have increased profits and lost market share. These firms may be liquidating share to improve profits, or simply losing market share to aggressive competitors in a profitable industry. Cell III businesses, "builders," have increased market share, but face eroding profitability. Cell IV businesses, "decliners," are suffering losses in both market share and profitability.

The basic focus of this research was on dynamic performance situations, and businesses that appeared to be following a holding strategy were excluded. Future investigations should attempt to determine differences between stable share and/or profit businesses and businesses experiencing the dynamic performance conditions listed above.

Because of the limited guidance provided by earlier efforts, this research was viewed as exploratory and inductive. As such, it was not appropriate to develop detailed hypotheses. However, the sum total of the literature discussed above suggests that the variables influencing market share and profitability consist of a combination of environmental and strategic factors. As a result, contextual variables, primarily reflecting overall performance and industry structure, were included with strategic variables to furnish a more comprehensive picture of each performance situation and differences among them.

Method

The PIMS Data Base

The research analyzed data drawn from the Profit Impact of Market Strategies (PIMS) data base. For a discussion of the PIMS data base and its general strengths and weaknesses, see Anderson and Paine (1978), Hambrick et al. (1982), and Phillips et al. (1983). The data base has been

acknowledged as a high quality, reliable source of data, perhaps the best available for large sample research.

The PIMS data base has been used for a number of recent studies of business strategy, environment, and performance, including virtually all the empirical research mentioned above. This extensive use is both an advantage and a disadvantage. It promotes the systematic extension and refinement of previous research, but it also limits the generalizability of an entire body of research findings. This drawback is compounded because the data base is not completely representative of businesses in general. The 2,000 business units drawn from about 200 corporations tend to be more dominant and more effective than the total population of business units.

For this research, however, the data base was appropriate for at least two reasons. First, the study was designed to explain and expand on previous PIMS research that appeared contradictory. Initial analysis pointed to a market share-profitability trade-off; subsequent research questioned this finding. Second, the sample was selected to include businesses with a variety of performance results. Although the performance extremes within the PIMS data base may not be the same as those for the total population, they provide a reasonable setting for exploration and theory building. Obviously, all PIMS research needs to be replicated outside the data base.

The Sample

The sample for this research was drawn from the last four years of available data on mature industrial product businesses in the data base ($n = 659$). PIMS respondents classified themselves in the mature stage of the life cycle if industry demand was growing in real terms at less than 10 percent, if products were familiar to the vast majority of prospective users, and if the technology and competitive structure of the industry were reasonably stable. Introduction, growth, and decline businesses and all consumer-product businesses were excluded to improve sample homogeneity.

The businesses were classified into one of the four performance groups based on the point change in relative market share (Δ RMS) and the point change in pretax return on investment (Δ ROI) between the average for the first two years and the average for the last two years of data. Relative market share is defined as the percentage of the business's market share divided by the percentage market share of its three largest competitors. It is highly correlated with absolute market share (.9). Businesses with a change in relative market share (mean = -.9; median = 0; $S.D. = 10.9$) between ± 1 point were excluded from the research. These businesses appeared to be following a holding strategy, and they represented approximately the middle third of the data. Using a similar approach, businesses with a change in ROI (mean = .7; median = .3; $S.D. = 8.2$) between ± 3 points also were excluded from the research. Once again, these businesses represented approximately the middle third of the sample.

As depicted in Figure 1, a total of 106 businesses met the criteria for superstars, 52 businesses met the criteria for harvesters, 52 businesses met the criteria for builders, and 84 businesses met the criteria for decliners. Although the overall correlation between Δ RMS and Δ ROI was relatively low (.14), it is noted that the performance situations with the largest cell sizes were those in which market share and profitability varied together. This is consistent with the findings of Hambrick et al. (1982) and Hambrick and Schecter (1983). Figure 1 also contains descriptive statistics for Δ RMS and Δ ROI in each cell. As a final check of the sample, SIC codes for businesses in each performance situation were examined to determine whether cell membership was based strictly on industry. The analysis suggested strongly that this was not the case.

Variables

Because of the large number of contextual and strategic variables prominent in business strategy research and the exploratory nature of this study, more than 50 variables were included in the initial data analysis. Although the complete set of results may be of interest to some readers and is available from the authors, reporting them in this paper would obscure some of the key findings and prove overwhelming to the reader. Thus this paper reports and discusses the results for 27 variables. The list of variables was restricted to those that have been most prominent in previous theory and research on the determinants of market share and profitability, as well as those that yielded the most interesting or significant findings.

The contextual and strategic variables are listed and defined in Exhibit 1. Four-year averages of each variable were used, as opposed to change variables, to provide a clear picture of the contexts and strategies associated with businesses in each performance situation. Although the total number of variables appears relatively large, they are divided into 11 contextual variables and 16 strategic variables. Contextual variables consist of two performance variables and nine industry structure variables. Strategic variables were grouped to facilitate their discussion in the results section.

As outlined above, several different approaches have been taken to performance measurement in market share-profitability research. The performance variables have been included to help resolve previous inconsistencies. The industry structure variables were drawn from the integrating work of Porter (1980). These variables represent major components of the five competitive forces that are the basis for his model of industry competition. The model suggests that strong industry and market growth, high industry concentration, stable shares, limited competitor entry, and high buyer fragmentation lead to superior returns. Table 1 contains expectations for the direction of changes in ROI and RMS based on the impact of each strategic variable. Selected literature is used to support these expectations, as well as to justify the inclusion of these strategic variables in the study. Once again, detailed research hypotheses were premature. Future research may employ specific hypotheses and fewer variables as patterns begin to emerge.

Exhibit 1

Contextual and Strategic Variables: Definitions

Contextual Variables

Performance variables

Relative market share (average): Percentage of the business' market share divided by the percentage market share of its three largest competitors.

ROI (average): Net income divided by average investment (book value).

Industry-structure variables

Long-term growth: Percentage change in industry sales over the last 10 years.

Served market growth: Percentage change in size of served market over the last four years.

Concentration: Percentage of industry sales or shipments by four largest businesses in the industry.

Major competitors' share: Percentage market share of top three competitors.

Share instability: Instability of business' market share.

Total shares instability: Instability of business' market share plus the cumulative instability of the market shares of the three largest competitors.

Order of market entry: The business was either a pioneer, an early follower, or a later entrant to the market; higher value indicates later entry.

Major competitor entry: Competitors have entered the served market during the past five years and have gained at least a 5 percent market share.

Buyer fragmentation: Number of immediate customers that represent 50 percent of business' sales.

Strategic Variables

Product competition variables

Relative product quality: Percentage of products superior to competitors' products from perspective of the customer minus percentage of products inferior to competitors' products from the perspective of the customer.

Relative service quality: Quality of customer services relative to competitors.

Relative price: The average level of selling prices of business' products and services, relative to the average price of the three largest competitors.

R&D variables

Product R&D expenses/revenues: Products and services R&D expenses divided by net sales.

New products % of sales: New products as a percentage of total sales.

Relative new products: Percentage of new products for business minus percentage of new products for competitors.

Marketing variables

Sales force expenses/revenues: Sales force expenses divided by net sales.

Relative media advertising and promotion expenses: Media advertising and sales promotion expenses relative to three largest competitors.

Vertical integration variables

Value added/revenues: Sales minus purchases divided by net sales plus lease revenues.

Relative integration backward: Degree of vertical integration backward of business relative to its three largest competitors.

Production/investment variables

Customization: The products or services of this business are more or less standardized for all customers, or designed to produce to order for individual customers; high value indicates products or services customized.

Investment/revenues: Average investment (book value) divided by net sales.

Cost variables

Relative direct cost: Percentage of relative direct costs (manufacturing, production, and distribution) per unit.

Price-cost gap: Selling price growth minus weighted cost growth.

Employee variables

% employees unionized: Percentage of total employees that are unionized.

Relative compensation: Wage and salary levels relative to competitors.

Data Analysis

Cell means and standard deviations were calculated for all variables. Two-way analysis of variance was used to identify significant main effects and interaction effects among the four performance situations. Duncan's multiple range test (Duncan, 1955), as modified by Kramer (1956) for unequal cell sizes, was used to identify significant mean differences for the interaction effects.

Table 1
Strategic Variables: Tentative Impact on Δ ROI and Δ RMS
with Selected Literature Support

<i>Strategic Variables</i>	<i>Impact on ΔROI ΔRMS</i>		<i>Literature Support</i>
<i>Product competition variables</i>			
Relative product quality	+	+	Anderson & Zeithaml (1984) Buzzell & Wiersema (1981) Hall (1980) Hambrick et al. (1982) MacMillan et al. (1982) Phillips et al. (1983)
Relative service quality	+	+	Anderson & Zeithaml (1984) Hall (1980) Hambrick et al. (1982)
Relative price	+	+	Hall (1980) Hambrick et al. (1982) MacMillan et al. (1982) Phillips et al. (1983)
<i>R&D variables</i>			
Product R&D expenses/revenues	-		Anderson & Zeithaml (1984) Hambrick & Schecter (1983) MacMillan et al. (1982)
New products: % of sales		+	Buzzell & Wiersema (1981)
Relative new products		+	Buzzell & Wiersema (1981)
<i>Marketing variables</i>			
Sales force expenses/revenues	-	+	Buzzell & Wiersema (1981) Hambrick & Schecter (1983) Hambrick et al. (1982) MacMillan et al. (1982)
Relative advertising and promotion expenses		+	Anderson & Zeithaml (1984) Buzzell & Wiersema (1981) Hambrick et al. (1982)
<i>Vertical integration variables</i>			
Value added/revenue	+	+	Anderson & Zeithaml (1984) Hambrick et al. (1982) MacMillan et al. (1982)
Relative integration backward		+	Anderson & Zeithaml (1984) Hambrick et al. (1982)
<i>Production/investment variables</i>			
Customization	-		Anderson & Zeithaml (1984)
Investment/revenue	-	-	Anderson & Zeithaml (1984) Hambrick et al. (1982) MacMillan et al. (1982)
<i>Cost variables</i>			
Relative direct cost	-	-	Hambrick et al. (1982) Phillips et al. (1983)
Price-cost gap	+		Intuitive relationship
<i>Employee variables</i>			
% employees unionized	-		Schoeffler (1977)
Relative compensation	+	+	Anderson & Zeithaml (1984)

Results and Discussion

Tables 2 and 3 report the means and standard deviations for the contextual variables and strategic variables, respectively, and indicate the significant main effects and interactions.

Table 2
Contextual Variables: Cell Means, Standard Deviations, ANOVA Results

Contextual Variables	Cell Means (Standard Deviations)				Main Effects	
	I		II		vs.	Interaction
	Superstars	Harvesters	Builders	Decliners	AROI I, II, III, IV	ARMS I, II, III, IV
<i>Performance variables</i>						
Relative market share (average)	65.31 ^b	92.13	92.99 ^a	87.28		*
ROI (average)	25.46 ^a	27.50 ^a	20.17 ^b	23.11 ^b		
<i>Industry structure variables</i>						
Industry long term growth	8.75 ^{ad}	9.67 ^{ac}	6.94 ^{bd}	8.73 ^{bc}	*	*
Served-market growth (%)	12.67 ^{ad}	17.85 ^{ac}	3.24 ^{bd}	10.85 ^{bc}	***	***
Industry concentration	56.98 ^a	61.20 ^a	53.50 ^b	54.47 ^b	*	
Major competitors' share	49.87 ^a	43.79 ^b	42.28 ^b	45.09 ^b		*
Share instability	5.61 ^a	4.66	3.55 ^{bd}	5.50 ^c		**
Total shares instability	13.25 ^b	14.66 ^a	12.27 ^b	14.89 ^a		**
Order of market entry	1.80 ^{ac}	1.44 ^{bd}	1.58 ^{ad}	1.57 ^{bd}		*
Major competitor entry	.22 ^b	.31 ^a	.17 ^b	.37 ^a		**
Buyer fragmentation	122.6 ^b	235.8 ^a	174.5	132.1 ^b		*

^{a,b}Refers to comparisons within a row for which the mean scores of performance situation(s) a are significantly higher than the mean scores of performance situation(s) b.

^{c,d}Refers to comparisons within a row for which the mean scores of performance situation(s) c are significantly higher than the mean scores of performance situation(s) d.

* $p \leq .05$

** $p \leq .01$

*** $p \leq .001$

Performance Variables

Table 2 indicates two significant results for the performance variables. First, the average relative market share of superstars was significantly lower than the average RMS of builders. Although not significant, the average RMS for superstars also was lower than that for harvesters and decliners. This finding suggests that, in general, superstars begin with a smaller market share base.

Second, businesses with an increasing ROI have a significantly higher average ROI than businesses with a decreasing ROI. Harvesters had the highest ROI, builders had the lowest, and the average ROI of superstars and decliners fell between these extremes. Because builders had significantly higher levels of average relative market share than did superstars, the additional increases in market share characteristic of builders may have been very expensive in terms of ROI.

These results appear to resolve some of the contradictory findings on the market share-profitability trade-off. Clearly, a large portion of the sample, superstars, were able to record substantial concurrent increases in market share and profitability. However, consistent with Buzzell et al. (1975), the average ROI of increasing RMS businesses was lower than the average ROI of the harvesters, although the difference was not statistically significant. Builders reported the lowest average ROI. The previous research that employed static measures of ROI for increasing market share businesses (superstars plus builders) evidently assumed a profit sacrifice, that lower levels of ROI were equivalent to foregone or eroded levels of profitability.

This assumption may have limited applicability even for superstars (i.e., ROI levels and increases could be greater without share increases), but the significant performance differences already identified in this study between superstars and builders suggest that other factors may influence the magnitude, if not mitigate the existence, of this trade-off. An interesting issue, therefore, centers on the additional differences that may be found between superstars and builders. To this point, superstars appear to be less dominant in their markets than do businesses in other performance situations.

Industry Structure Variables

Table 2 reveals a number of significant differences with respect to industry structure variables. Increasing ROI businesses reported significantly greater industry long term growth rates and served-market growth rates than did decreasing ROI businesses. Consistent with the definition of mature stage businesses, industry growth rates averaged below 10 percent. However, the served-market growth rates indicate that some businesses served market segments that were expanding at a more rapid pace. Industry and served-market growth may have acted to reduce the level of competitive rivalry in these situations, thereby allowing superstars and harvesters to extract superior returns (Porter, 1980).

In addition, decreasing RMS businesses had higher growth rates than increasing RMS businesses. Although no significant interactions were identified, harvesters experienced the highest growth rates; builders had the lowest growth rates. Several factors may have resulted in these relationships. Higher served-market growth rates may have attracted more competition, hurting the relative market shares of harvesters without detracting from profitability. The market shares of builders may have been enhanced by a competitive deemphasis on these markets because of slow growth. Strategic differences between harvesters and builders also may be responsible for inconsistent growth rates. The strategies implemented by harvesters may stress profitability, yet stimulate the growth of the served-market segment to a greater degree than the strategies implemented by builders. Market share growth may be less an end in itself for harvesters, because they are able to realize increased profits and, perhaps, absolute market size through served-market growth. Therefore, goal and strategic differences, coupled with moderate shifts in competition, may have led to these apparently counterintuitive results.

Consistent with the industrial organization economics literature, increasing ROI businesses operated in industries that were more concentrated than did decreasing ROI businesses. Superstars were in markets in which major competitors held a larger share than was true for the competitors of harvesters, builders, and decliners. This finding is consistent with the previous result concerning the lower relative market share of superstars.

Despite the substantial increase in RMS among builders, share instability was significantly greater among both superstars and decliners. Share instability among all competitors within their markets was greater for decreasing RMS businesses. Decliners appear to face volatile conditions that have adversely affected their competitive position. Superstars seem to have been the beneficiaries of share changes in less turbulent market shifts. Builders reported the lowest levels of share instability for both themselves and their competitors.

The analysis of market entry variables showed that superstars entered their markets significantly later than did businesses in the other performance situations. Decreasing RMS businesses confronted a significantly higher level of competitive entry during the previous five years. The later market entry of superstars may explain to some degree their weaker competitive position. Consistent with the speculation associated with the growth results outlined above, higher entry rates in the markets of harvesters and decliners may be partially responsible for the erosion of their competitive positions. In some cases, superstars may be the predators that have damaged the competitive positions of harvesters and decliners.

A significant interaction was identified for the buyer fragmentation variable. Harvesters reported the most fragmented markets, significantly more so than did superstars and decliners. Once again, this finding and the superior profit position of harvesters are consistent with Porter's (1980) comments on the impact of the power relationship between the firm and its buyers.

Harvesters may be able to exert greater power over their customers because they appear to be less dependent on one or a few of them, thereby leading to above-average profits. Conversely, superstars had the least fragmented markets.

Strategic Variables

Table 3 contains the results for the strategic variables. The results for these variables are perhaps the most intriguing; they involve comparisons of the specific actions that businesses may implement to enhance their competitive and/or profit positions.

The first result among the product competition variables suggests one such action. Compared to their major competitors, superstars have managed a significantly higher level of product quality than have builders and decliners. Although this finding does not indicate that builders and decliners have low quality products (products in their industries may simply be more standardized), it does demonstrate that superstars have been able to differentiate their products successfully along the quality dimension. This appears to be an important distinction between superstars and builders. The value of product differentiation through quality has been a repeated theme in PIMS studies (Anderson & Zeithaml, 1984; Buzzell et al., 1975; MacMillan, Hambrick, & Day, 1982; Phillips et al., 1983), as well as other theory and research (Hall, 1980; Porter, 1980). In fact, this result is highly consistent with the conclusions of Phillips et al. (1983) regarding the positive effects of product quality on market position and ROI. Businesses intending to achieve concurrent increases in market share and profitability should explore the opportunities for quality differentiation within their markets.

Increasing ROI businesses were less differentiated from their competitors in terms of service quality than were decreasing ROI businesses. Service quality may not be a competitive factor in these markets, service quality may be uniformly high among superstars and harvesters, or builders and decliners may find it necessary to rely on service because of the nature or quality of their products. However, superstars and harvesters again reported significantly higher prices relative to their competitors than did decreasing ROI businesses. This finding is consistent with the quality differentiation strategy of these firms. Builders and decliners may find it difficult to charge higher prices than their competitors, particularly with more limited quality differences.

Among R&D variables, the analysis revealed no significant differences for the product R&D expense/revenue variable. Despite this finding, new products represented a significantly higher percentage of sales for superstars than for harvesters, builders, and decliners. Superstars also introduced a significantly higher percentage of new products relative to competitors than did harvesters and decliners. These results suggest that superstars were more efficient in their use of product R&D, or perhaps that they benefitted from the R&D of earlier market entrants.

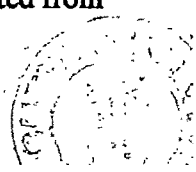


Table 3
Strategic Variables: Cell Means, Standard Deviations, ANOVA Results

Strategic Variables	Cell Means (Standard Deviations)				Main Effects	
					ΔROI	
	I Superstars	II Harvesters	III Builders	IV Decliners	I, II vs. III, IV	I, III vs. II, IV
<i>Product competition variables</i>						
Relative product quality	30.90 ^{ac} (.88)	24.19 ^a (.86)	19.98 ^{bd} (.83 ^a)	22.15 ^{bd} (.86)	*	*
Relative service quality	105.2 ^a (7.72)	104.7 ^a (5.97)	103.6 ^b (4.98)	103.3 ^b (5.19)	*	*
<i>R&D variables</i>						
Product R&D expenses/revenues	1.71 (16.53)	1.30 (4.37 ^{ad})	1.44 (5.22 ^{bd})	2.01 (2.78)		
New products: % of sales	10.18 ^{ac} (8.24)	4.57 ^{ad} (6.21)	5.22 ^{bd} (7.40)	3.29 ^{bd} (5.27)	*	*
Relative new products	2.27 ^{ac}	-2.23 ^{bd}	.46 ^a	-.79 ^{bd}	***	***
<i>Marketing variables</i>						
Sales force expenses/revenues	5.98 ^a (4.88)	4.92 ^a (4.00)	4.41 ^b (2.98)	4.80 ^b (4.87)	*	*
Relative media advertising and promotion expenses	5.22 ^b (1.66)	5.07 ^b (1.65)	5.71 ^a (1.84)	5.52 ^a (1.54)	*	*
<i>Vertical integration variables</i>						
Value added/revenue	59.89 ^a (14.94)	57.78 ^a (15.59)	52.10 ^b (13.29)	55.67 ^b (16.09)	**	*
Relative integration backward	1.82 ^{bd} (.64)	2.12 ^{ac} (.51)	1.85 ^{bd} (.60)	1.87 ^{ad} (.59)	*	*
<i>Production/investment variables</i>						
Customization	39 ^{ac} (.49)	31 ^a (.46)	23 ^{bd} (.42)	24 ^{bd} (.43)	*	*
Investment/revenue	48.32 (19.79)	48.92 (22.86)	46.95 (17.50)	47.72 (20.60)		
<i>Cost variables</i>						
Relative direct cost	102.6 (8.71)	101.6 (6.56)	101.3 (6.29)	102.5 (6.83)	***	***
Price-cost gap	.10 ^a (4.73)	.82 ^a (4.16)	-1.72 ^b (3.67)	-2.42 ^b (4.57)		
<i>Employee variables</i>						
% employees unionized	38.90 ^b (34.36)	38.23 ^b (33.38)	48.94 ^a (34.62)	49.02 ^a (33.01)	**	*
Relative compensation	99.60 ^b (5.91)	100.9 ^b (5.18)	101.5 ^a (7.40)	101.8 ^a (6.77)	*	*

^aRefers to comparisons within a row for which the mean scores of performance situation(s) a are significantly higher than the mean scores of performance situation(s) b.

^{ad}Refers to comparisons within a row for which the mean scores of performance situation(s) c are significantly higher than the mean scores of performance situation(s) d.

^eRefers to comparisons within a row for which the mean scores of performance situation(s) e are significantly higher than the mean scores of performance situation(s) f.

* $p \leq .05$

** $p \leq .01$

*** $p \leq .001$

Two significant main effects were identified among the marketing variables. Sales force expenses as a proportion of revenues were significantly higher for increasing ROI businesses than for decreasing ROI businesses. Decreasing ROI businesses spent more than competitors on media advertising and promotion expenses than did increasing ROI businesses. The proportionately greater investment in sales force made by superstars may be attributable both to a smaller revenue base and to the demands of a more innovative, quality and price-differentiated strategy. The advertising and promotion approach taken by decreasing ROI businesses may reflect their less innovative, differentiated strategy, as well as a market share orientation, particularly among builders. A sales force may not be required to market such products, and the declining profitability of these businesses does not seem to encourage a sales force emphasis to achieve share increases.

Value added as a proportion of sales revenues, a variable often used as a measure of vertical integration, was significantly greater for increasing ROI businesses. Superstars had the highest value added mean; builders had the lowest. This relationship is consistent with the relative product quality and relative price differences noted above. Superstars and harvesters also may have managed their expenses more efficiently. A significant interaction effect was identified for relative vertical integration backward. Compared to their major competitors, harvesters reported a higher level of vertical integration backward than businesses in the other performance situations. This finding is consistent with previous PIMS research concerning vertical integration among dominant firms in mature industries.

Both significant and nonsignificant results were of interest among the production/investment variables. A significant interaction was identified regarding the level of customization versus standardization used in the production process. Superstars reported a significantly higher level of customization than did builders and decliners. This finding adds further clarity to the overall differentiation strategy that appears to be emerging for superstars. Unlike previous PIMS research, no association was found between the investment as a proportion of sales revenue variables and ROI. Typically, capital investment has an inverse relationship to profitability; in this case, however, slightly higher levels of capital investment were found among increasing ROI businesses.

Despite differences in relative product quality, relative price, and value added/revenues, no significant difference was identified between performance situations for direct costs compared to competitors. However, increasing ROI businesses demonstrated a positive change in the gap between selling price growth and weighted cost growth; decreasing ROI businesses reported a negative change. The ability of increasing ROI businesses to raise prices faster than costs relates directly to their superior levels of profits, product quality, value added, market growth, and industry concentration. Once again, these results are entirely consistent with Phillips et al. (1983), who found that product quality had a beneficial impact on relative direct costs through increased market share.

Two employee variables were the final strategic variables included in the analysis. Decreasing ROI businesses reported significantly higher levels of employee unionization and relative compensation than did increasing ROI businesses. The presence of labor unions and the adverse compensation relationship with competitors among decreasing ROI businesses probably inflated costs and detracted from overall profitability.

Summary and Conclusions

Initial empirical research—for example, Buzzell et al. (1975)—indicated that a trade-off existed between increases in market share and profitability. Conversely, Hambrick et al. suggested that “multiple, seemingly incompatible objectives can be pursued in tandem. More research is needed on the circumstances that favor such ‘well-rounded’ effectiveness and on the internal features that can promote or stymie it” (1982, p. 528). The research reported here was an attempt to resolve the contradiction and provide evidence concerning the contextual and strategic factors that influence a firm’s ability to achieve simultaneous increases in market share and profitability.

An examination of performance differences among the four dynamic performance situations revealed that previous research was less inconsistent than some literature suggested. Increasing RMS businesses had mean levels of profitability slightly below the mean ROI levels of decreasing RMS businesses, but the difference was not significant. However, a large group of increasing RMS businesses, termed superstars, also registered substantial increases in ROI; others, termed builders, faced diminishing profits.

Superstars

Superstars were later entrants to their markets than were businesses in the other performance situations. Probably as a result, they appeared to have less dominant positions in their markets. However, these markets were experiencing moderate growth and concentration levels, likely contributing to the firm’s overall profitability. In recent years, superstar markets had also been relatively free of major competitive entries. Their share instability perhaps was due to their own predatory behavior and competitive response. These contextual factors suggest that superstars may be located in a late shakeout-early maturity stage of market development.

In terms of basic strategy, the analysis indicated that superstars attempted to differentiate their products from competitors through higher quality, price, and innovation. This innovation emphasized a higher percentage of new customized products, supported by higher sales force expenditures. The efficient management of costs and R&D expenses most likely contributed to favorable changes in the price-cost gap and to superior value added as compared to businesses with declining profitability. The Phillips et al. (1983) research also would suggest that the product differentiation strategy implemented by superstars promoted market share growth, which, in turn, helped

to control increases in relative direct costs and to improve ROI. Superstars also appear to have avoided extraordinary labor costs.

Harvesters

In general, harvesters were early market entrants and appeared to be fairly dominant businesses in terms of market share and profits. Similar to superstars, they operated in more concentrated markets that still were experiencing some growth. However, greater market share turbulence seems to have been precipitated by competitive rivalry coming from a somewhat higher incidence of major competitive entry over the past five years. Harvesters also faced the most fragmented markets of the performance situations, probably allowing them superior power and flexibility in their relationships with customers.

The analysis indicated several strategic similarities between harvesters and superstars. Harvesters appeared to differentiate their products based on quality and price and to customize somewhat more than did decreasing ROI businesses. They also spent more on their sales forces. They achieved a significantly higher level of value added compared to decreasing ROI businesses and a very positive price-cost gap. Harvesters also reported significantly lower levels of unionization and compensation relative to competitors than did decreasing ROI businesses.

In contrast to superstars, harvesters did not reach the same level of product quality differentiation and customization, although the differences were not significant. They appeared to offer a more stable product line; they were substantially below superstars with respect to new product introductions in terms of both new products as a percentage of sales and new products relative to competitors. This approach, plus their strong market and profit position, may have contributed to a more mature and predictable environment, allowing harvesters to emphasize backward vertical integration relative to competitors significantly more than other businesses. In turn, this integration helped to control costs.

Builders

Two of the most notable characteristics of builders were found among the performance variables. First, builders had the highest average relative market share, significantly greater than superstars. Second, they exhibited relatively low returns. A strategy of standardized, low-priced products may have contributed to the substantial relative market share, but this strategy used in the pursuit of additional, perhaps unwarranted, market share probably had an increasingly detrimental impact on ROI. As a result, this strategy, coupled with industry structure differences, made the success of superstars difficult for builders to duplicate.

Builder markets were more stable, less concentrated, and experienced relatively lower growth rates than did increasing ROI businesses. Major competitive entry was less frequent than among decreasing RMS businesses, suggesting very mature industries.

Builders did not differentiate themselves from competitors based on product quality and price to the extent found among superstars and harvesters. Instead, they seemed to differentiate themselves on service quality, media advertising, and promotion to a greater degree than increasing ROI businesses. Builders also did not achieve the same level of new product introductions as superstars, and they tended to standardize their products more than increasing ROI firms. In sum, the pursuit of additional market share and these industry structure and strategic differences most likely placed downward pressures on prices, squeezing value added, the price-cost gap, and, ultimately, profitability.

Decliners

Decliners were similar to builders with several exceptions. They reported somewhat higher returns. They were faced with significantly greater share instability than builders, perhaps because of a higher rate of major competitive entry over the past five years. Decliners recorded the smallest percentage of new product sales, favoring standardized products. The slump in selling price growth compared to cost growth was somewhat worse than among builders, thereby squeezing profitability. Unionization and relative compensation also were higher among decliners than among increasing ROI businesses, probably contributing to declining profits.

Recommendations

This study was intended as an initial step in a more thorough exploration of market share-profitability trade-offs. The research suggests that under proper market conditions and with the use of certain strategies, simultaneous increases in market share and profitability are possible. Although concrete prescriptions are premature, later entrants to moderate growth markets selling innovative, high quality products may be able to achieve this end. More conservative strategies implemented by established firms may yield increases in profitability at the expense of market share, especially in more turbulent markets. Standardized product offerings in stagnant markets may increase market share, but competitive pressures on prices appear to erode profits.

Future research should concentrate on several issues. First, businesses in other performance situations should be examined. Businesses in growth markets should be studied, particularly because market growth appears to exert some influence on changes in profitability. In addition, businesses in the more dynamic performance situations should be compared to businesses following a holding strategy. This should provide further insight on contradictions in previous literature.

Second, the relative contribution of individual contextual and strategic factors to the explanation of performance trade-offs should be determined. Future research should use the tentative relationships described in this study to develop more specific testable hypotheses.

Third, although significant differences were identified among businesses in the four performance situations, other contextual and strategic factors should be included in more comprehensive studies. This research again pointed to the relevance of certain generic strategies (e.g., product differentiation and standardized, low price) that may be used to reduce the complexity of these studies. Clearly, the role of strategy implementation is one that requires considerable attention.

Finally, this research should be extended and replicated using different data sources and analytical techniques. One example of such research was provided by Hall (1980). The causal modeling approach taken by Phillips et al. (1983) also should clarify the relationships among key variables. Theory-guided industry and firm case studies, participant observation, longitudinal analysis, and cross-sectional studies should provide additional insight into the complex relationship between changes in market share and profitability.

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Employee Ownership, Work Attitudes, and Power Relationships¹

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Relationships of employee equity in the company with work attitudes, information, and desired influence were examined in a prosperous firm converted to employee ownership by its management. Questionnaire data suggested that relationships of shareholding with organizational identification and information about the firm's finances were moderated by employees' authority and status in the firm.

Recent years have witnessed growing interest in the implications of employee ownership for discontent in the workplace. Many argue that shareholding by employees enhances their identification with the organization by creating perceptions of common interests and stakes in the firm's success. In addition, ownership allegedly promotes job satisfaction by sensitizing employees to the significance of their role in the firm, by enabling them to capture more of the returns from their work (Hammer, Stern, & Gurdon, 1982), and by fostering more cooperation (Long, 1978a).

For others, the attraction of employee ownership lies in the incentives and supports it provides for employee participation in decision making. Some argue that shareholding by employees leads to desires for more influence by creating incentives to participate to protect one's investment and beliefs that such participation is legitimate. The ability to participate also may be promoted by employee ownership. In most firms, expertise in financial issues is an important power base. Because employee shareholders have a greater stake in the firm, they may acquire more information about its finances than nonowners.

Empirical studies of employee ownership are of recent origin and thus few in number. Moreover, inconsistencies in the available work suggest that the implications of shareholding are more complex than often supposed.

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For example, relationships of ownership with both desired influence (Hammer & Stern, 1980; Kruse, 1981; Long, 1982) and satisfaction (Long, 1978b; Russell, Hochner, & Perry, 1979) vary greatly in the literature. As a result, a growing number of researchers argue that the consequences of shareholding are contingent on characteristics of the firm and the employees. Substantively, many suggest that employee ownership promotes favorable work attitudes and efforts to participate only when opportunities for significant employee control exist (Tannenbaum, 1983; Whyte, Hammer, Meek, Nelson, & Stern, 1983).

The contribution of the available studies to an evaluation of this position has been limited. Research has been confined to small firms in which employee owners enjoyed considerable access to mechanisms of control: producer cooperatives and directly-owned firms purchased by employees from the parent company to save jobs. Little attention has been devoted to more common and weaker forms of employee ownership initiated by management for financial and/or motivational reasons and often operated through employee stock ownership trusts that hold and manage the shares. In these oftentimes large and complex firms, the bulk of the employee shareholders, nonmanagerial personnel, rarely exercise significant influence because of the small portion of stock held, the lack of stock voting rights and representation on the board of directors, and/or management domination of the trust (Conte, Tannenbaum, & McCulloch, 1981).

If differences in employee control among organizations affect the implications of shareholding for attitudes and behaviors, control differences among employees *within* organizations may have similar effects. Such differences often are pronounced in the conventional employee-owned but management-controlled firms and reflect inequalities in the distribution of not only formal authority and influence but also status. White collar employees typically are accorded higher status because of their formal training, nonmanual tasks, and physical proximity to decision makers. Previous studies have focused largely on blue collar employees occupying lower positions in both status and authority hierarchies. Thus, they provide little information on the way in which control differences among employees in organizations affect the relationships of ownership with attitudes and behaviors.

The present research is concerned with the implications of shareholding by employees with varying degrees of control within conventional employee-owned but management-controlled firms. The first issue has to do with the relationships of shareholding with organizational identification and job satisfaction. Tannenbaum's (1983) perspective suggests that these relationships may be quite weak among those occupying lower positions in the authority, influence, and status hierarchies of these firms. Their relative lack of control coupled with the oftentimes considerable size and complexity of these firms allegedly reduce the significance of both ownership and their work roles to them as well as their perceptions of common interests with others in the firm. By contrast, this perspective implies that relationships

of shareholding with identification and satisfaction are stronger and more positive among employees with greater authority, influence, and status.

There is research, however, that questions the importance of employee control for these relationships. Empirical studies (Greenberg, 1981; Rhodes & Steers, 1981) suggest that employees typically purchase stock for financial reasons and with few expectations of exercising greater influence in decision making. Thus the lack of control by most employee shareholders under conventional forms of employee ownership may be less likely to weaken the relationships of shareholding with identification and satisfaction than is often supposed. Finally, it is quite conceivable that these relations are more positive among those with less control because their identification and satisfaction may be more dependent on ownership than that of employees with greater authority, influence, and status. The research questions thus are: (1) Do the relationships of shareholding with organizational identification and general job satisfaction differ among employees with varying degrees of control? (2) If so, are such relations stronger and more positive among those with greater or lesser control?

The second issue concerns the relationships of shareholding by employees with the desire to influence decision making and the possession of financial information that might enable them to do so. Such relationships may be stronger among those with greater authority, influence, and status in the firm. These employees have more opportunities to participate in decision making and are less prone to question their rights and abilities in this regard. In addition, they usually enjoy greater access to financial information and are better equipped by training and experience to understand it. Thus, owners in the white collar and managerial strata face fewer constraints on their ability to obtain information and influence. By contrast, constraints on access to information and influence may suppress the relationships of shareholding with financial information and desired influence among nonmanagerial employees. Alternatively, more positive relations may be found among those with less control because shareholding for these employees may serve as a more important basis for information and influence. The research questions thus are: (1) Do the relationships of shareholding with financial information and desired influence differ among employees with varying degrees of control? (2) If so, in what manner?

An adequate examination of these questions requires controls for employees' tenure in the organization. Positive associations of tenure with identification, satisfaction, information, and desired influence may be expected. Moreover, the equity that individuals accumulate under employee stock ownership plans (ESOPs) is strongly related to their time in the firm. As a result, controls for tenure are needed to ensure that relations of ownership with these other variables are not spurious.

Method

The firm serving as the research site sells, installs, and services heating, cooling, and plumbing systems. It prospered in the 1970s. By 1980 sales had reached about \$56 million and the employees numbered 650.

Since 1958 the firm has operated an employee stock ownership plan. Employees can participate after one year and may contribute from 3 percent to 5 percent of their wages, with the firm contributing at least 25 percent of the annual pre-tax profits. Each year, shares are distributed to participants in proportion to their contributions and length of service, and all carry voting rights. Virtually all the shares are held by current employees, and nearly all those eligible participate in the plan (88 percent).

Although the firm is owned by the employees directly rather than through a trust, it has much in common with typical ESOP firms. The distribution of stock is very unequal; at the end of 1980, the managerial employees, who comprise about 20 percent of the workforce, held about 76 percent of the shares. In addition, the ownership plan makes no provisions for representation of employee owners on the board of directors. These factors, coupled with the lack of union representation, have limited the influence of non-managerial employee-owners within the firm. By the same token, the substantial appreciation of the firm's shares in recent years has left few grounds for challenging management on the basis of inept stewardship.

Several months of interviewing a wide range of the firm's employees preceded the development of the questionnaire. This instrument was subsequently completed by 87 percent of the employees on company time.

Measures

Organizational identification was operationalized by averaging responses (1 = strongly disagree to 5 = strongly agree) to nine statements regarding feelings of common interests with the organization, loyalty to it, and a willingness to work hard on its behalf (Steers, 1977). Representative statements were: (1) What is good for the company is good for me, (2) I don't feel that I am an important member of this company (code reversed), and (3) If offered a job with another firm at slightly higher pay, I would take it (code reversed). *General job satisfaction* was constructed by averaging responses to two items. The first asked for the extent of agreement with the statement, "Basically, I don't like my job." The coding, 1 = strongly disagree to 5 = strongly agree, was reversed. The second was the General Motors faces scale (Hammer & Stern, 1980), which consists of six faces ranging from a broad smile to extreme disgruntlement. Respondents were asked to take all facets of their jobs into account and "place an X under the face which best tells how you feel about your job." *Desire for influence* was measured by averaging responses (4 = very much, 1 = none) to items asking how much influence respondents desired over decisions by supervisors, division heads, and corporate officials. *Financial information* was based on a count of correct responses to three questions about the firm's sales and contribution to the stock purchase plan.

Ownership, the value of shares held in the firm, was measured by responses to the question, "What is the approximate value of your shareholdings?" (0 = none, 1 = less than \$1,000; 2 = \$1,000 to less than \$5,000; 3 = \$5,000 to

less than \$15,000; 4=\$15,000 to less than \$40,000; 5=\$40,000 or more). *Perceived influence* was based on five items. Three asked how much influence respondents felt they actually had over decisions made by their supervisors, division heads, and top management (4=very much to 1=none). The other two asked about their success as individuals and as members of a group in persuading the immediate supervisor to change something (4=successful often or always to 1=never asked or asked but never succeeded). The responses were averaged. *Authority* was based on the respondents' positions in the managerial hierarchy (Bacharach & Lawler, 1980) as inferred from job titles. The coding was nonmanagerial employees=0, first-line supervisors=1, and middle managers=2. *White collar status* was based on the type of work performed. Blue collar employees, coded 0, included both those performing manual work and their first-line supervisors; white collar employees, coded 1, included both office workers and middle managers. *Tenure* in the firm was operationalized by reported years of service.

Table 1 contains the means and standard deviations of these variables as well as their intercorrelations.

Table 1
Means, Standard Deviations and Correlation Matrix of Variables
(N= 520)^a

	\bar{X}	S.D.	1	2	3	4	5	6	7	8	9
1. Organizational identification	3.844	.604	(.783) ^b	.606	.290	.240	.528	.394	.312	.330	.294
2. General job satisfaction	4.329	.691		(.603)	.178	.095	.381	.144	.167	.122	.185
3. Financial information	.915	.980			(.572)	.126	.291	.363	.364	.280	.384
4. Desire for influence	2.638	.593				(.795)	.469	.135	.103	.108	.153
5. Perceived influence	2.207	.565					(.727)	.312	.298	.246	.282
6. Ownership	1.271	1.468						—	.407	.792	.329
7. Authority	.337	.669							—	.345	.494
8. Tenure	3.805	4.777								—	.344
9. White collar status	.242	.429									—

^aIn some cases the *N*s are slightly lower due to missing data.

^bAlpha coefficients on diagonals where appropriate.

Results

Moderated multiple regression (Peters & Champoux, 1979) was used to examine the relationships of interest. In the analyses of identification, satisfaction, financial information, and desired influence, a similar procedure was followed. First, an additive model was examined by regressing each of these four variables on ownership, tenure, perceived influence, authority, and white collar status. Second, three multiplicative interaction terms of ownership times perceived influence, ownership times authority, and ownership times white collar status were then entered as a set. The significance

Table 2
Multiple Regression Analyses

	<i>Organizational Identification (N=470) Beta</i>	<i>General Job Satisfaction (N=461) Beta</i>	<i>Financial Information (N=474) Beta</i>	<i>Desire for Influence (N=473) Beta</i>
Ownership	.183	-.081	.187	.319
Tenure	.030	.010	-.129	-.037
Perceived influence	.385**	.321**	.121*	.500**
Authority	.237**	.103	.137	-.035
White collar status	.132*	.125	.054	.001
	$R^2 = .3544$	$R^2 = .1512$	$R^2 = .2411$	$R^2 = .1983$
Ownership \times perceived influence	.139	.163	-.027	-.317
Ownership \times authority	-.264**	-.120	-.042	-.062
Ownership \times white collar status	-.067	-.085	.337**	.085
	$R^2 = .3759$	$R^2 = .1590$	$R^2 = .2679$	$R^2 = .2040$

* $p \leq .05$ ** $p \leq .01$

of this set is determined by the extent to which the addition of these variables to the additive model increases R^2 (Cohen & Cohen, 1975).

In the first column of Table 2 are shown the results of the analysis of organizational identification. The standardized betas are from the complete regression equations which include the interaction terms. The data indicate that the addition of the interaction terms increases R^2 from .3544 to .3759 ($p \leq .01$). Thus, the relationship of shareholding with identification appears to vary with employee control as indicated by authority, influence, and status. Of the partial regression coefficients of the interaction terms, only that of ownership times authority emerged as significant (beta = -.264, $p \leq .01$). This suggests that the relationship of ownership with identification is more positive among those at the lower rather than higher levels of the hierarchy of authority. Although perceived influence and white collar status did not affect the ownership-identification relationship, both were positively related to identification (e.g., beta = .385, $p \leq .01$ for perceived influence).

The results of the analysis of general job satisfaction are shown in the second column. The addition of the interaction terms did not significantly increase R^2 . The only significant relationship indicated by the regression coefficients is that of satisfaction with perceived influence.

The third column contains the results of the regression of financial information. The addition of the interaction terms resulted in an increase in R^2 from .2411 to .2679 ($p \leq .01$). Thus, the relationship of shareholding with information appears to vary with employee control. However, of the regression coefficients of the interaction terms, only that of ownership times white collar status proved significant (beta = .337, $p \leq .01$). This suggests that the positive relationship of ownership with financial information is stronger among white collar than blue collar employees. Although not affecting the ownership-information relationship, perceived influence was positively related to information (beta = .121, $p \leq .05$).

The results of the regression of desire for influence are shown in the fourth column. The data indicate that the addition of the interaction terms had no effect on R^2 . Of the variables in the additive model, only perceived influence was related to desired influence ($\beta = .500, p \leq .01$).

Discussion

Stated broadly, the results provide little support for the notion that the effects of shareholding on attitudes and behavior are more pronounced among employees with more authority, influence, and status in the firm. None of these aspects of employee control affected the relationship of shareholding with general job satisfaction. Moreover, the nonsignificant partial coefficient of shareholding in the regression analyses of satisfaction indicated that these two variables were unrelated.

By contrast, the data suggested that the relationship of shareholding with organizational identification was affected by one dimension of employee control, formal authority. But, contrary to the expectations of Tannenbaum (1983), the relation was more positive among those with lesser authority. The strength of this relationship among nonmanagerial employees may stem, in part, from low expectations of control. Its weakness among managerial personnel may stem from lesser dependence on ownership as a mechanism for identification. Alternatively, it may indicate that managerial employees, committed to the firm or not, are under pressure to purchase stock to support the ownership plan.

The results also challenge the notion that the desired influence of employees with greater control is increased more by shareholding than is that of employees at lower levels in the status, authority, and influence hierarchies. Employee control did not affect the relationship of shareholding with desired influence. The nonsignificant partial coefficient of shareholding in the regression of desired influence indicated that these variables were unrelated. The financial orientation of these employee owners and satisfaction with the performance of their stock may have dampened interests in playing more active roles in decision making. Over three quarters indicated that they viewed shareholding as an investment rather than the chance to become an owner where they worked and that they were highly satisfied with the ownership plan. Finally, the data indicated that the relationships of shareholding with financial information were affected by employee status and were more positive among white collar than blue collar employees. The reluctance of employee owners to seek more influence often is attributed to their lack of sufficient expertise to participate effectively. These findings suggest that information deficiencies are less likely to hinder the participation of the white collar owners.

The complexity of the present results underscores the need for further research. In terms of design, longitudinal studies are needed to clarify issues of causality. Substantively, research is needed on the expectations that employees bring to ownership roles. The present results are consistent with the

view that employees treat shareholding largely in financial terms and expect satisfactory economic returns but not necessarily greater influence in decision making. Several related issues also merit attention. First, refinements are needed in the measurement of stockholdings in order to assess their economic significance to employees. This might involve corrections for income and wealth levels as well as economic needs. Second, studies of the implications of the financial performance of employee-owned firms for the attitudes and behaviors of employee shareholders might prove fruitful. Owners' satisfaction with their jobs and influence may be contingent on the performance of their stock. Finally, research on the implications of employees' authority, influence, and status for their perceptions of the rights and rewards of employee shareholders is needed. Such work might enhance understanding of the complex ways in which employee control affects relationships of shareholding with attitudes and behaviors.

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Research Notes

PARADIGM DEVELOPMENT AND COMMUNICATION IN SCIENTIFIC SETTINGS: A CONTINGENCY ANALYSIS¹

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More than ten years ago, Lodahl and Gordon (1972) published an investigation in which they applied the concept of paradigm (Kuhn, 1962) to the study of task uncertainty in scientific settings. Their data showed that scientists in fields with developed paradigms (physics and chemistry) exhibited greater consensus on theory, methodology, and training than did those in fields with undeveloped paradigms (sociology and political science). This consensus provided a more certain or predictable work environment, which in turn facilitated teaching and research activities. Lodahl and Gordon concluded that these findings provide encouraging support for conceptualizing paradigm development in terms of task uncertainty, and they recommended further research into its organizational implications in scientific settings.

In an attempt to explore further the usefulness of the paradigm concept, researchers have investigated the effects of paradigm development on various organizational processes, including influence patterns in universities (Beyer & Lodahl, 1976), grant allocations (Pfeffer, Salancik, & Leblebici, 1976), editorial practices in journal organizations (Beyer, 1978), academic turnover (Salancik, Staw, & Pondy, 1980), and university budgeting (Pfeffer & Moore, 1980), among others. Without exception, their findings are consistent with the original conceptualization of Lodahl and Gordon (1972) and, together, provide a strong empirical base for the use of paradigm development as a measure of task uncertainty in scientific settings.

Based on this foundation, Cheng and McKinley (1983) recently examined the implications of paradigm development for bureaucratic control and performance in scientific settings. They presented data suggesting that the effect of bureaucratic control on scientific performance is contingent on the paradigm development of the scientific field. In fields with highly developed paradigms, bureaucratic control was positively related to performance. As paradigm development decreased, however, this relationship declined significantly and became negative in fields with less developed paradigms.

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These findings are potentially significant in that they point to the need for a contingency approach to the study of scientific performance. They also raise questions about the generality of some earlier findings on scientific performance that did not take account of differences in paradigm development (Pelz & Andrews, 1966).

The purpose of this study is to investigate further the paradigm concept as a contingency factor in relation to scientific performance. The focus of the study is on the contingency effect of communication on scientific performance, and the organizations studied are research units in universities. The investigation includes a theoretical analysis and an empirical test of the proposition derived from that analysis. The theoretical perspective that guides this study is the information-processing model of organization (Galbraith, 1972).

Background and Theoretical Analysis

Several premises provide the theoretical underpinnings for this study. An initial premise is that the greater the task uncertainty, the greater the amount of information an organization has to process in order to accomplish its task (Galbraith, 1972). If the task is well understood, much of the activity can be preplanned, and the information processing requirements for the organization are relatively small. If the task is not well understood, new information must be processed during task execution, and the information processing requirements for the organization become substantial (Tushman & Nadler, 1978). In scientific settings, the importance of information processing varies with the field's level of paradigm development. The lower the paradigm development, the greater the task uncertainty, and thus the greater the importance of information processing.

A second premise is that in scientific settings, oral communication is a particularly efficient medium through which information is gathered, transferred, and processed. Unlike written communication, oral communication permits rapid feedback, decoding, and synthesis of complex information (Porter & Roberts, 1976; Tushman, 1978). These qualities are essential to scientific communication because most research ideas are ambiguous and difficult to articulate, particularly at the formulation stage. Thus, oral communication represents a primary medium for information exchange in scientific settings. It will be used in this study as a measure of a research unit's information processing activity.

A third premise is that oral communication is effective only to the extent that the actors share a common language scheme (Tushman & Katz, 1980). According to these authors, lack of linguistic commonality between actors can lead to errors in the interpretation of messages analogous to "noise" in physical systems that cause error in message reception. In scientific settings, researchers spend almost as much time in task-related communication with colleagues outside their own unit (but within the same organization) as with colleagues within their own unit (Katz & Tushman, 1979; Pelz

& Andrews, 1966). To the extent that different organizational units have different language schemes (Porter & Roberts, 1976), interunit communication could result in misinformation because of an incorrect or incomplete understanding of the message's information content. This misinformation stemming from interunit communication may have negative consequences for research units as far as their scientific performance is concerned.

Taken together, these three premises argue for an interaction effect of paradigm development and communication on research unit performance. The lower the paradigm development, the higher the information-processing requirements, and thus the greater the effect of communication on research unit performance. Because of the limitations discussed in the third premise, this effect will be positive for intraunit communication but negative for interunit communication. These ideas can be summarized into the following hypothesis:

Hypothesis: The lower the paradigm development, the more positive the relationship between intraunit communication and research unit performance, but the more negative the relationship between interunit communication and research unit performance.

Method

Sample. The study sample consisted of 350 academic research units located in six countries: Austria, Belgium, Finland, Hungary, Poland, and Sweden. Included were 88 academic institutions and 3 scientific fields—biology, chemistry, and physics. The use of these three fields, which vary in paradigm development but are all "hard science" disciplines, permits a more stringent test of the hypothesis. A typical research unit consisted of a unit head and a staff of about nine people, including the scientists, technicians, and clerical personnel.

Data Collection. The data were collected using a combination of personal interviews, organizational records, and on-site administration of standardized questionnaires. A detailed description of the data-collection instruments and sampling procedure is provided by Andrews (1979).

Measures. Two single-item scales were used for measuring intraunit and interunit communication. Intraunit communication was measured by asking scientists in the research unit to indicate (on a 5-point scale) how frequently they met as a group to discuss scientific/technical matters. They also were asked to indicate (on a 6-point scale) how frequently they discussed scientific/technical matters with colleagues in other research units within the same organization. The latter information was used as a measure of interunit communication. For both measures, the homogeneity of unit members' responses was tested for the appropriateness of pooling using a 2-step procedure developed by Tushman (1978). Results from the first step indicated that pooling was appropriate for each of the two communication variables ($p < .05$). The second step eliminated ($p < .01$) three and five cases for the intraunit and interunit communication variables, respectively.

Research unit performance was assessed in terms of three types of scientific output the unit had produced during the past three years: (1) number of books published, (2) number of journal articles published outside the country, and (3) number of journal articles published within the country. These data were collected from project records provided by the unit heads. Six units did not have complete data on all three output items and were deleted from the study sample. Because the original output scores showed skewed distributions, they all were transformed to lognormal scores using the Pelz and Andrews (1966) procedure. To adjust for the uneven scientific importance of the three types of output, a weight of 3 was assigned to the number of books published, 2 to the number of journal articles published outside the country, and 1 to the number of articles published within the country (Cheng & McKinley, 1983). A composite index was constructed by summing the weighted, transformed scores across items.

Paradigm development was assessed in terms of the unit's scientific field. Units performing research in physics and chemistry were assigned to a developed paradigm group ($N=202$), and units performing research in biology were assigned to a less developed paradigm group ($N=134$). This classification was based on (1) Lodahl and Gordon's (1972) rankings of paradigm development in seven scientific fields and (2) the combined rankings of 20 academic disciplines reported by Salancik et al. (1980) and Pfeffer and Moore (1980). In the Lodahl and Gordon study, paradigm development was measured on the basis of scientists' evaluations of how developed they perceive various fields to be. Their data showed that physics had an average rank score of 1.38, chemistry had a score of 1.75, and biology 2.93. In the Salancik et al. (1980) and Pfeffer and Moore (1980) studies, paradigm development was measured in terms of (1) course sequencing in departments and (2) the length of dissertation abstracts. The Salancik et al. study ranked physics 2, chemistry 5, and general biology 15. The Pfeffer and Moore study ranked both physics and chemistry 5.5 and physiology (a specialized discipline in biology) 4. Because physics and chemistry had similar rankings in these studies, they were combined into one paradigm group here. Averaging the rankings from the Salancik et al. and Pfeffer and Moore studies, physics and chemistry as a group were ranked 4.5, and biology 9.5.

Seven additional variables were included as controls. The first five were dummy variables for the six countries studied. The remaining two were unit size—measured in terms of the number of staff members in the unit (including scientists, technicians, and clerical personnel) and the number of research units within the organization that were active in the same or similar field(s). Data for this variable were provided by the unit heads.

Results

Three separate moderated regressions were performed to test the hypothesis. The first tested for a positive interaction effect of intraunit communication and paradigm development (coded 1 for low and 0 for high) on

Table 1
Moderated Regression Results^a

Predictor	Research Unit Productivity		
	Analysis 1	Analysis 2	Analysis 3
Hungary ^b	-.10	-.07	-.10
Austria	-.13	-.11	-.12
Belgium	-.01	-.00	.01
Sweden	-.20†	-.20†	-.19†
Poland	-.25††	-.24††	-.25††
Unit size	.29††	.29††	.30††
Number of units inside organization	.12†	.12†	.11†
Intraunit communication	.00		-.00
Interunit communication		.02	.02
Paradigm development ^c	-.21	.24	-.01
Intraunit communication × paradigm development	.28**		.32***
Interunit communication × paradigm development		-.22*	-.27**
R ² =	18%	18%	20%

^aCoefficients are the standardized regression coefficients (β 's).

^bFinland is the base comparative country.

^cReverse scale (1=low, 0=high).

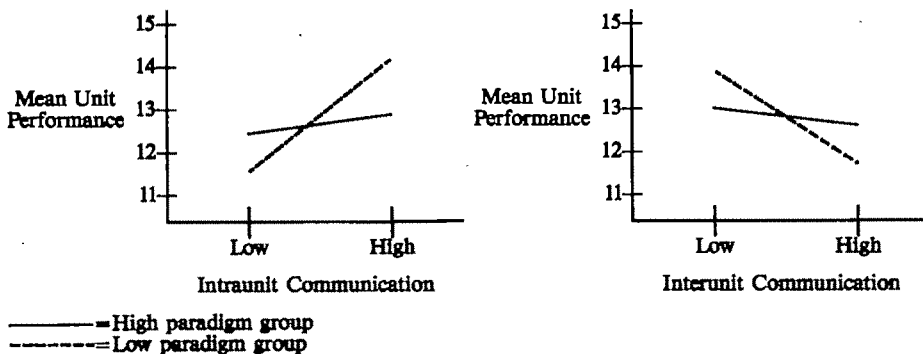
* $p < .10$; ** $p < .05$; *** $p < .025$ (one-tailed for hypothesized relationships)

† $p < .05$; †† $p < .01$ (two-tailed for control variables)

research unit performance. The second tested for a negative interaction effect of interunit communication and paradigm development on research unit performance. Finally, a more stringent test was performed to assess both interaction effects simultaneously using a single regression equation. Because the direction of the interaction effects had already been specified, one-tailed tests were employed.

As hypothesized, the first two sets of analyses (see columns 1 and 2 in Table 1) show a positive interaction effect for intraunit communication ($\beta = .28$; $p < .05$), and a negative interaction effect for interunit communication ($\beta = -.22$; $p < .10$). These effects remained significant even when they were assessed simultaneously using a single regression equation (see

Figure 1
Mean Performance of Research Units by
Level of Unit Communication for High and Low Paradigm Groups



column 3). The regression coefficients for the two interaction terms were $\beta = .32$ ($p < .025$) for intraunit communication and $\beta = -.27$ ($p < .05$) for interunit communication. These relationships were confirmed by the graphs shown in Figure 1. For both communication variables, the slopes of the graphs were in the predicted direction (positive for intraunit and negative for interunit communication). Further, the slopes were steeper in the low paradigm group than in the high paradigm group. Taken together, these results provide full support for the hypothesized relationships.

Discussion

The purpose of this study has been to explore further the explanatory power of the paradigm concept as a contingency factor in relation to scientific performance. Data from three "hard science" disciplines support the hypothesized interactive relationship among paradigm development, communication, and research unit performance. The lower the paradigm development, the more positive the relationship between intraunit communication and performance, but the more negative the relationship between interunit communication and performance. These findings thus reinforce the importance of including paradigm development as a contingency variable in studying scientific performance (Cheng & McKinley, 1983). They also provide new and additional support for conceptualizing paradigm development in terms of task uncertainty as originally proposed by Lodahl and Gordon (1972).

The present findings are similar to those of Katz and Tushman (1979) but contradict those of Pelz and Andrews (1966). Based on data from a subsample of 13 research projects in a large industrial laboratory, Katz and Tushman reported a significant positive relationship between intraproject communication and research project performance, and a nonsignificant negative relationship between extraproject (but within the same laboratory) communication and research project performance. Pelz and Andrews, based on data from 1,131 scientists in 11 academic, industrial, and governmental laboratories, found significant positive relationships between *both* intraunit and interunit communication and scientists' technical performances. One possible explanation for this discrepancy might be that Pelz and Andrews' sample consisted primarily of "applied" scientists doing developmental research. To the extent that developmental research is more standardized in its terminology than basic research, interunit communication could be as effective as intraunit communication as far as information processing is concerned. Taken together, these findings suggest a two-dimensional contingency framework for the study of scientific communication: (1) level of paradigm development of a scientific field, and (2) the basic-applied orientation of the research. Future studies might explore the predictive utility of this two-dimensional framework, thus leading to a more complete understanding of the role of communication in scientific settings.

The present findings also have implications for the current effort on integrating organizational research and practice (Beyer, 1982). Thomas and Tymon (1982) recently have recommended a strategy that calls for active involvement of practitioners in feedback and review processes. Although this strategy is intuitively appealing, it might have unanticipated negative consequences because of different frames of reference or language schemes between researchers and practitioners. A more fruitful approach might be first to encourage each group to develop a framework as to what its constituents consider as utilizable research, followed by two-way interactions between representatives from each group who are well versed in both organization research and practice. This strategy is similar to the two-step process suggested by Tushman and Katz (1980) for effective communication between engineers working on "locally-oriented" developmental research and external sources of information.

Finally, from a more pragmatic standpoint, this study reinforces the importance of managing communication activities in research organizations. The present data show that the more productive units had more intraunit but less interunit communication than the less productive units. In terms of managerial actions, these results suggest that administrators may have to be selective in their attempts to promote communication activities in research organizations. Because of the problems involved in interunit communication, as discussed earlier, frequent contacts between scientists from different research units may need to be de-emphasized. Intraunit communication, on the other hand, can be encouraged and facilitated. This can be achieved by (1) de-emphasizing formality and status differences in the research unit, thus reducing the psychological barriers to communication, (2) promoting supportive and trusting relationships among scientists in the unit, (3) arranging regular meetings for progress reports and idea exchange, and (4) abolishing physical barriers to communication and placing researchers in close proximity to one another.

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THE INFLUENCE OF ORGANIZATIONAL STRUCTURE ON INTRINSIC VERSUS EXTRINSIC MOTIVATION

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Research on intrinsic motivation has demonstrated that extrinsic rewards can have a negative effect on intrinsic motivation under certain conditions (Calder & Staw, 1975; Daniel & Esser, 1980; deCharms, 1968; Deci, 1971, 1972, 1975a, 1975b; Greene & Lepper, 1974; Pinder, 1976; Ross, 1975; Staw, Calder, Hess, & Sandelands, 1980). According to Deci's cognitive evaluation theory, there are two processes by which extrinsic rewards can affect intrinsic motivation. The first occurs if there is a change in the perceived locus of causality. Hence, when a person is intrinsically motivated, the locus of causality is within themselves (deCharms, 1968). However, when external rewards are made contingent on behavior and the individual begins to perceive that he or she is engaging in the activity for these rewards, then

the perceived locus of causality shifts from within the individual to the extrinsic reward, resulting in decreased intrinsic motivation (Deci, 1975a, 1975b). The second process is based on the assumption that people are intrinsically motivated to perform activities that make them feel self-determining and competent (Deci, 1975b; White, 1959). Thus, reward or feedback can negatively affect intrinsic motivation by negatively affecting feelings of competence or self-determination (Deci, 1975b).

It should be noted that extrinsic factors have a negative effect on intrinsic motivation only under certain conditions. For example, Deci, Cascio, and Krusell (1975) have suggested that contingent rewards and even non-contingent rewards will have a negative impact on intrinsic motivation only if a shift in the perceived locus of causality occurs or if there are decreased feelings of self-determination or competence. Furthermore, the effect is likely to occur only if the rewards are salient (Ross, 1975), the task is interesting (Daniel & Esser, 1980), and the reward is situationally inappropriate (Staw et al., 1980).

Most of the early research on intrinsic motivation focused on the effects of extrinsic monetary rewards, but more recent studies have demonstrated that external constraints, in general, may negatively affect intrinsic motivation. For example, Lepper and Greene (1975) found that the act of monitoring individuals' behavior resulted in decreased intrinsic motivation. Similarly, in an investigation on goal setting, Mossholder (1980) found that externally mediated goal setting could have a negative impact on intrinsic motivation, but this effect is contingent on the type of task. In an experiment that manipulated autonomy or self-determination (i.e., the level of procedural specification), Zuckerman, Porac, Lathin, Smith, and Deci (1978) found that greater external constraints in the form of procedural specification negatively affected the level of intrinsic motivation. Similarly, Fisher (1978) reported that subjects who were placed under greater constraints and had less personal control over performance also had lower intrinsic motivation. Finally, Amabile, DeJong, and Lepper (1976) demonstrated that when external constraints take the form of deadlines, a decrement in subsequent intrinsic interest in the task results.

These studies suggest that although past research typically has focused on the effects of tangible rewards on intrinsic motivation, extrinsic factors do not necessarily need to be tangible in order to result in decreases in intrinsic motivation. It is the general perception of external constraints that can cause decreased feelings of self-determination and result in reduced intrinsic motivation.

Most previous research on intrinsic motivation has focused on the effects of extrinsic rewards and micro level constraints, but there has not been research investigating the effects of the macro level structural variables that ostensibly are primary external constraints in any organization. Hence, *it is hypothesized that the structural characteristics of the organization itself may have a very strong negative impact on levels of intrinsic motivation if the organization approaches the mechanistic end of the structural continuum.*

Based on Deci's (1975a, 1975b) theory, this would be an expected outcome because greater levels of centralization, formalization, standardization, and so on reduce flexibility and autonomy and increase control, resulting in decreased perceptions of self-determination. Although this effect may be of only minor importance in private and public sector organizations, it is of critical importance in voluntary or third sector organizations in which extrinsic incentives are scarce and the organization is dependent largely on voluntary activity that is primarily intrinsically motivated (Staw, 1976, 1977). Thus, it is the objective of this study to investigate the degree to which organizational structure influences intrinsic motivation in the setting of a voluntary organization.

Method

Sample. The sample of voluntary organizations utilized in this investigation consisted of 44 conservative Protestant churches from six denominations. These included conservative Baptist, Presbyterian, Methodist, Brethren, Lutheran, Nazarene, and independent churches. In selecting the sample, the general system of belief was controlled by means of administering a 7-statement doctrinal inventory to the leadership (i.e., pastor) of each church. Only churches whose leadership expressed a conservative Protestant doctrine were selected. This sampling procedure allowed a relatively homogeneous sample to be drawn in terms of doctrine.

Procedure. Questionnaires were administered to ministers and to 25 randomly selected members from the membership rolls of each congregation. Questionnaires were distributed by mail with self-addressed, stamped return envelopes. Of the 1,100 questionnaires mailed out to members, 543 were returned: thus a response rate of 49 percent was obtained. Responses were obtained in all cases from the leadership; however, missing data were problematic in several cases. Calculations to determine the minimal sample size for each organization were conducted in order to insure that all estimates were within ± 5 percent accuracy. On completion of the data collection, only two organizations were eliminated because of an inadequate number of respondents. Thus, the usable sample included 42 churches.

Measures. Six structural variables were measured in this investigation. These included standardization, formalization, integration, centralization, levels of hierarchy, and organizational size. Standardization was operationalized by a 5-item instrument developed by Sherman (1981) which assessed the level of standardization in the meetings and administration of the church. Specific items questioned the degree to which services or meetings were planned according to standard patterns, the degree to which liturgy was utilized, and the degree to which procedures for conducting church activities were governed by standardized procedures as opposed to being developed spontaneously. For this scale, a coefficient alpha of .77 was obtained.

The second structural variable, formalization, was operationalized by means of a 4-item instrument (Sherman, 1981) which assessed the degree

to which written records were kept (i.e., attendance), the degree to which written formal policies and rules had been developed to cover activities and operations of the organization, and the formalization in the services (e.g., clergy and other participants wearing robes). A coefficient alpha of .60 was obtained for this scale.

The third structural variable, integration, was measured by determining the level of communication occurring between members in the system (Tichy, Tushman, & Fombrun, 1979). This was operationalized specifically by asking the sampled individuals to estimate the total number of minutes in a sample 3-day period that they spent communicating with other members in a task or church related manner.

Centralization was measured by asking the leadership (i.e., pastors) if their church utilized (1) a congregational system in which they assumed the central leadership role, or (2) a representative system in which a group of elders assumed the leadership responsibility but the pastor still exercised greater authority, or (3) a representative system in which a group of elders assumed leadership responsibility with the pastor having no greater authority than any other elder.

The fifth structural variable, levels of hierarchy, was measured by determining the number of hierarchical levels including regional and national denominational levels of authority. Organizational size, the final structural variable, was measured by consulting the church records to obtain an assessment of the current number of members.

The two dependent variables, intrinsic motivation and extrinsic motivation, were measured by means of the instrument developed specifically for church settings by Allport (1959, 1963) and later refined by Feagin (1964) (also see Dittes, 1969, and Hood, 1971). This instrument has been widely used in both the sociological and psychological literatures on religion. According to Allport and Ross (1967), for those people who are high in extrinsic religious motivation, religiosity is utilitarian, self-serving, and self-protecting. In contrast, Allport and Ross maintain that those who are high in intrinsic religious motivation regard their Christian faith as a supreme value in its own right.

The two scales based on Feagin's (1964) factor analyses are each composed of six items. A coefficient alpha (computed at the individual level) of .65 was obtained for extrinsic motivation (e.g., "One reason for my being a church member is that such membership helps to establish a person in the community," and "What religion offers me most is comfort when sorrows and misfortune strike"). For intrinsic motivation a coefficient alpha of .60 was obtained (e.g., "It is important to me to spend periods of time in private religious thought and meditation," and "The prayers I say when I am alone carry as much meaning and personal emotion as those said by me during services"). Although these coefficient alphas were somewhat lower than values obtained in other investigations, the lack of homogeneity may be attributable to the different aspects of church-related activity referred to in the items. Furthermore, it should be noted that these scales are similar

to other instruments used in the literature in that they assess whether activity is an end in itself or whether it is instrumental in serving other ends. However, these scales differ from other instruments in the context to which they apply (i.e., the church as opposed to a work setting or an experimental task).

The means, standard deviations, and intercorrelations among the variables in the study are presented in Table 1.

Table 1
Means, Standard Deviations, and Correlations
Among Study Variables^a

Variable	\bar{X}	S.D.	1	2	3	4	5	6	7	8
1. Intrinsic motivation	26.34	1.13	—							
2. Extrinsic motivation	15.63	2.32	-.45	—						
3. Integration	107.38	69.11	.34	-.28	—					
4. Centralization	2.31	.78	-.26	.57	-.23	—				
5. Hierarchy	2.95	.97	-.37	.69	-.24	.43	—			
6. Standardization	10.36	3.88	-.32	.11	-.18	.11	.41	—		
7. Formalization	7.95	2.52	-.45	.54	-.30	.37	.75	.53	—	
8. Organizational size	363.76	317.32	-.45	.22	-.26	.47	.12	-.01	.28	—

^aFor a sample size of $n=42$, $r=.26$ is significant at $p<.05$.

Data Analysis. The nature of this investigation necessitated the collection of data at two levels of analysis in order to examine the influence of structure (organizational level) on intrinsic motivation (individual level). All of the structural variables (with the exception of integration) were measured at the macro level of analysis from information obtained from the leadership of each organization. The dependent variables (intrinsic and extrinsic motivation) were measured at the micro level of analysis from responses obtained from individual members. Theoretically, integration should be considered a macro level structural variable. However, although intrinsic and extrinsic motivation clearly are individual level constructs, because the data analysis must be conducted at one level of analysis, it was determined that the three variables that were measured at the individual level should be aggregated for each organization. Then stepwise multiple regression could be employed to ascertain the degree of variation explained by structural variables in intrinsic and extrinsic motivation. In addition, the relative contributions of the various structural variables could be assessed. Furthermore, using this procedure, the hypothesis could be tested: as organizational structure approaches the mechanistic end of the structural continuum, intrinsic motivation decreases.

Before progressing with the data analysis, however, it was important to establish the appropriateness of aggregation empirically. Roberts, Hulin, and Rousseau (1978) and James (1982) stipulate that before aggregating a construct whose unit on which theory is based is the individual, small within-organization variance relative to between-organization variance must be demonstrated. Roberts et al. (1978) recommend the use of analysis of variance

to compare within-organization variance with between-organization variance to determine if aggregation is appropriate. Hence, this procedure was conducted for each of the three aggregated variables. For intrinsic motivation, the results of the analysis of variance yielded $F=1.72$ ($p<.01$). For extrinsic motivation, $F=2.99$ ($p<.01$) was obtained. Finally, for integration the results yielded $F=2.54$ ($p<.01$).

Results

The results of the regression analyses are presented in Table 2. Formalization was eliminated from the analyses because of its stronger interrelationship with other structural variables. This was done in the interest of avoiding problems with multicollinearity. Hence, standardization, centralization, integration, hierarchy, and size were included as structural predictor variables.

Table 2
Regression of Intrinsic and Extrinsic Motivation
on the Organizational Structure Variables

Structural Variables	Intrinsic Motivation		Extrinsic Motivation	
	Beta	F	Beta	F
Organizational size	-.45	7.72***	.01	.00
Standardization	-.29	4.08**	-.17	2.03
Hierarchy	-.23	1.99	.67	25.44***
Integration	.15	1.04	.02	.02
Centralization	.11	.42	.25	3.17*
	$R^2=.41$; $df=5,32$; $F=4.44$; $p<.01$		$R^2=.61$; $df=5,32$; $F=9.80$; $p<.001$	

* $p<.05$; ** $p<.01$; *** $p<.001$

The results indicated that the structural variables explained a relatively large amount of variance in both intrinsic and extrinsic motivation. For the first analysis, 41 percent of the variation in intrinsic motivation was explained by the structural variables. In the second analysis, 61 percent of the variation in extrinsic motivation was explained by the structural variables.

The results of these regressions and the Pearson product-moment correlations reported in Table 1 generally support the hypothesis that as structure becomes increasingly mechanistic, intrinsic motivation decreases. For the bivariate correlations all six structural variables were statistically significant, and their values were consistent with the hypothesis. Centralization, hierarchy, standardization, and formalization exhibited negative correlations with intrinsic motivation. Integration, for which lower values would be indicative of a mechanistic structure (Tichy et al., 1979), exhibited a positive relationship with intrinsic motivation. Although increased organizational size cannot be considered characteristic of either organic or mechanistic structures, it was found to be negatively related to intrinsic motivation. Furthermore, it was determined that size was related to mechanistic structure for three of the five structural dimensions. Hence, it appears that

in the case of churches greater size is associated with an increasingly mechanistic structure; however, the direction of causality cannot be ascertained from these data.

In the stepwise regression analysis for intrinsic motivation, organizational size ($p < .001$) and standardization ($p < .01$) were found to have the greatest negative impact on intrinsic motivation. Although the coefficient for centralization was not significant, its value was positive. Because the bivariate correlation between centralization and intrinsic motivation was $-.26$, ($p < .05$), it is suggested that this result may be attributed to some minor multicollinearity resulting from the imperfect independence among the predictor variables.

When the Allport and Ross (1967) indicator of extrinsic motivation was utilized as the dependent variable, the results, in general, were consistently opposite of those for intrinsic motivation. The Pearson product-moment correlations were significant ($p < .05$) for four of the six structural variables. Furthermore, the values of the correlations were consistent with the hypothesis in all cases, indicating that the level of extrinsic motivation was positively associated with mechanistic structure. Furthermore, in the regression analysis (Table 2), the variables that explained the greatest variance in extrinsic motivation were hierarchy ($p < .001$) and centralization ($p < .05$), indicating that in churches, these two characteristics of mechanistic structure have the strongest impact on extrinsic motivation.

Discussion

The findings of this investigation further extend knowledge in this area of research by demonstrating the influence of organizational structure on intrinsic motivation. These results reinforce recent findings that have shown that external constraints, in general, can have a negative impact on intrinsic motivation (Amabile et al., 1976; Fisher, 1978; Lepper & Greene, 1975; Mossholder, 1980; Zuckerman et al., 1978). According to Deci (1975b), these results can be interpreted based on the process whereby the general perception of external constraints causes decreased feelings of self-determination, which then result in reduced intrinsic motivation. In the case of organizational structure, as the organization approaches the mechanistic end of the structural continuum, a decrease in perceptions of self-determination ostensibly will result, based on the reduction in autonomy, freedom, and the increase in formal rules and standardized procedures.

One potential implication of these findings is the possibility that if mechanistic structure undermines intrinsic motivation, this may subsequently and inadvertently result in the need for greater controls, formalization, and centralization. Hence, a mechanistic organizational structure may breed the need for a more extremely mechanistic system because of the reduction in intrinsically motivated behavior. In a sense, one might conclude that the findings from this area of research isolate one more determinant of the general phenomenon of bureaucracy breeding greater bureaucracy.

Perhaps the most important implication of these findings stems from the fact that in voluntary organizations, where extrinsic incentives are more scarce, there is a greater dependence on the intrinsically motivated activity of the participants (Staw, 1976, 1977). Any factor, such as organizational structure, that may potentially undermine this intrinsic motivation must be carefully considered. Therefore, in the interest of increasing voluntary activity in the context of a church, it is important that the organization develop a more organic as opposed to mechanistic structure. Greater decentralization of authority and decision making, with a decreased emphasis on bureaucratic formalization and standardized procedures, should positively affect intrinsically motivated voluntary activity.

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THE MODERATING ROLE OF WORK CONTEXT IN JOB DESIGN RESEARCH: A TEST OF COMPETING MODELS

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The job characteristics approach to job design has argued and provided evidence to support the belief that enriched or complex jobs are associated with increased satisfaction, internal work motivation, and other important organizational outcomes (Hackman & Oldham, 1975, 1976). But the direct relationship between job complexity and work outcomes has been viewed as overly simplistic and incomplete, and much recent research reflects a search

for potential moderators of the job complexity-work outcomes relationships (O'Connor, Rudolf, & Peters, 1980).

Some research has been devoted to investigating the work context as a moderator. Consistent with the early work of Herzberg (1966), the belief has been that unfavorable aspects of the work setting will distract attention from job enrichment efforts and thus result in reduced effectiveness (Oldham, 1976). Thus the work context has been viewed as a necessary factor in the success of job redesign efforts based on the assumption that more fundamental or basic concerns must be addressed before higher level issues become prominent. The way the work context has been operationalized in previous research has been to assess the extent to which employees are satisfied with what are considered to be relevant aspects of the work setting. Oldham (1976) and Abdel-Halim (1978) examined only satisfaction with supervision and with co-workers; Oldham, Hackman, and Pearce (1976) investigated satisfaction with pay, co-workers, supervision, and security as moderators; and Katerberg, Horn, and Hulin (1979) considered satisfaction with pay, co-workers, and supervision as contextual aspects.

By operationalizing the work context moderator as satisfaction with select aspects of the work setting, typically as measured by the Job Diagnostic Survey (JDS), much of the previous research does not seem to have provided the best test of the moderating influences of the work context. The job design literature is explicit in its contention that a favorable "climate" is a necessary but not sufficient condition for the success of the job design interventions (Hackman & Oldham, 1980; Oldham & Hackman, 1980). In fact, Oldham (1976) suggested that further research was needed to give a better understanding of the potential moderating influences of other aspects of the work context such as the organization's climate. Yet, to date, climate, *per se*, has not been examined as a moderator. One purpose of the present study, then, was to examine the potential moderating effects of organizational climate on the relationship between job complexity and job satisfaction.

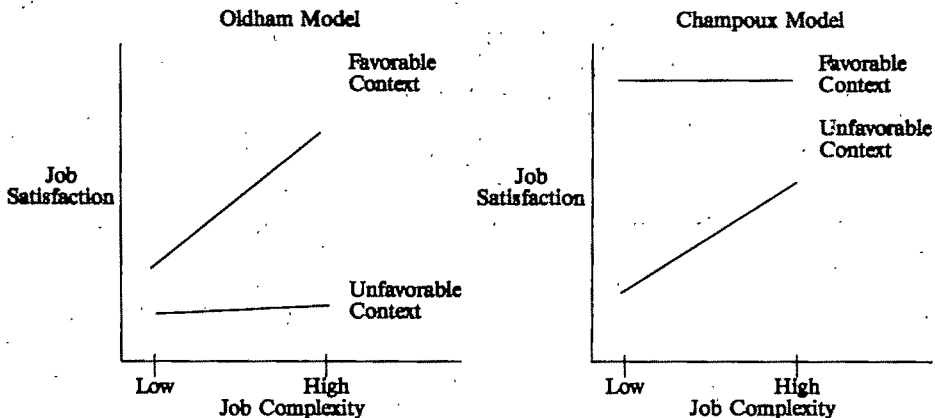
A criticism of some of the job design research in the past is that because the results are provided relative to overall job complexity there is little understanding concerning which of the specific job characteristics interact with the work context factors to influence work outcomes. However, in order for job design interventions to be focused and effective, such information seems critical. The present study addresses this criticism by first testing for the moderating effects of organizational climate on the job complexity-job satisfaction relationship. If a significant moderating effect is detected, the interactions of climate with the five core job characteristics are analyzed separately.

The second purpose of the present study was to attempt a clarification of the form of the interaction between job complexity and work context in light of the existing job design literature. Most of the research in this area has supported the view that a favorable work context is a necessary but not a sufficient condition for job complexity to influence job satisfaction

(Oldham, 1976; Oldham et al., 1976). Thus, the advocates of this model would argue that only under conditions of a favorable work context would job complexity be an effective predictor of job satisfaction.

An alternative form of the interaction between job complexity and work context on job satisfaction was reported recently by Champoux (1981). The form of the interaction showed larger regression coefficients at less favorable work context levels and small coefficients at favorable levels of the work context. Therefore, two competing models exist concerning the way in which work context moderates the work content-job satisfaction relationship. One model represents the findings reported by Oldham and his associates (Oldham, 1976; Oldham et al., 1976) and thus is labeled the Oldham model. The other model reflects the findings reported by Champoux (1981) and is identified as the Champoux model. These two models are graphically illustrated in Figure 1. The third purpose of the present investigation then was to provide a test of these two competing models.

Figure 1
Competing Models of Work Content-Context Interactions
on Job Satisfaction



Method

Sample. Data were collected from 104 nursing service employees who were employed in a skilled nursing care facility operated by a county government. All measures were collected by questionnaire administered to employees on-site during working hours. All employees present at work completed questionnaires as part of an organizational assessment. Subsequently, 10 cases were eliminated because of incomplete data; thus the sample consisted of 94 employees. Employees were told that aggregate data would be fed back to management and employees as a means of assessing current organizational functioning. Survey feedback sessions were conducted approximately four to six weeks after the data were collected. The average age of respondents was 32 years with a range of 18 to 67 years. The average time

spent on their present job was about 1 and a half years. All respondents were female.

Measures. Job characteristics were measured with the JDS (Hackman & Oldham, 1975). Employees responded to questions designed to assess the amount of skill variety, task identity, task significance, autonomy, and feedback in their jobs. The job complexity index or overall measure of work content used is the motivating potential score (MPS). The degree of general satisfaction with the job was measured using five items from the JDS.

The JDS job dimension measures and general satisfaction have known psychometric properties. Based on research with approximately 7,000 people on nearly 900 jobs in 56 organizations, internal consistency scale reliabilities for the above scales have averaged around .70 (Oldham, Hackman, & Stepina, 1978).

Organizational climate was assessed with the measure developed by Gavin (1975). Because of limited administration time, 54 items were selected from the 118-item climate scale. These items were selected a priori to capture climate rather than job satisfaction aspects of the work. Because the person's perception of the favorability of the work context was of interest, the climate measure represents more of an individual difference measure and an index of psychological climate rather than an organizational property. As an exploratory effort, no specific hypotheses were advanced concerning the particular dimensions of climate that should function as moderators. At this stage, employees' subjective evaluations of the overall favorability of the organization's working climate was the focus of analysis. Thus, an overall climate index was formed from a summation of the 54 items (with appropriate items reverse-scored), so that high scores were indicative of favorable organizational climate and low scores reflected unfavorable climate. The internal consistency reliability estimate (coefficient alpha) for the organizational climate scale was .94.

Results

Job Complexity, Job Characteristics, and Organizational Climate. Moderated regression analysis was used to examine the potential moderating effects of organizational climate. Such analytic strategies have been discussed by Zedeck (1971), and more recently as they apply to job design research (Champoux & Peters, 1980).

The initial data analyses examined the potential moderating effects of organizational climate on the job complexity-job satisfaction relationship. A simultaneous concern, if climate moderated this relationship, was the specific job characteristics that played a role. Thus, additional moderated regression analyses would be conducted for each job characteristic-job satisfaction relationship as an exploratory effort.

The results of the moderated regression analysis examining the restricted linear model with variables entered individually relative to the full model including the interaction term are presented in Table 1. The results are supportive of organizational climate as a moderator of the job complexity-job

satisfaction relationship. The interaction of job complexity and climate accounted for nearly 4 percent of the criterion variance in satisfaction over the restricted model.

Table 1
Moderated Regression Results for Job Complexity and Organizational Climate with General Satisfaction

<i>Moderator Organizational Climate^a</i>	<i>General Satisfaction</i>			
	<i>R²</i>	<i>ΔR²</i>	<i>F (Step)</i>	<i>df</i>
JC	.095	.095	9.73**	1,92
JC+OC	.231	.136	16.08**	1,91
JC+OC+JCOC	.266	.035	4.27*	1,90

^aJC=job complexity; OC=organizational climate; JCOC=job complexity×organizational climate interaction.

* $p < .05$

** $p < .01$

The finding of a significant job complexity×organizational climate interaction on job satisfaction is of interest in itself, but it provides little information concerning the role played by each of the five core job characteristics. Therefore, it was considered necessary to examine the potential moderating role of climate on the relationships between each of the job characteristics and job satisfaction. The results of these moderated regression analyses appear in Table 2. In examining the results, it can be seen that climate

Table 2
Moderated Regression Results for Job Characteristics and Organizational Climate with General Satisfaction

<i>Moderator Organizational Climate^a</i>	<i>General Satisfaction</i>			
	<i>R²</i>	<i>ΔR²</i>	<i>F (Step)</i>	<i>df</i>
SV	.130	.130	13.76**	1,92
SV+OC	.281	.151	19.14**	1,91
SV+OC+SVOC	.281	.000	.004	1,90
TI	.058	.058	5.69*	1,92
TI+OC	.239	.181	21.64**	1,91
TI+OC+TIOC	.277	.038	4.69*	1,90
TS	.000	.000	.02	1,92
TS+OC	.235	.235	27.93**	1,91
TS+OC+TSOC	.237	.002	.22	1,90
AUT	.103	.103	10.59**	1,92
AUT+OC	.261	.158	19.51**	1,91
AUT+OC+AUTOC	.295	.034	4.28*	1,90
FBK	.065	.065	6.34*	1,92
FBK+OC	.224	.160	18.78**	1,91
FBK+OC+FBKOC	.243	.019	2.24	1,90

^aSV=skill variety; TI=task identity; TS=task significance; AUT=autonomy; FBK=feedback; OC=organizational climate; SVOC=skill variety×organizational climate interaction; TIOC=task identity×organizational climate interaction; TSOC=task significance×organizational climate interaction; AUTOC=autonomy×organizational climate interaction; FBKOC=feedback×organizational climate interaction.

* $p < .05$

** $p < .01$

served as a moderator for two of the job characteristics–job satisfaction relationships. For both task identity and autonomy, the interaction term with climate resulted in a significant increment in the proportion of variance explained beyond the restricted linear model in which variables were entered individually.

Subgroup Correlation and Regression Analyses. In order to examine both the form and degree of the job complexity–job satisfaction relationship at different levels of organizational climate, subgroup correlations and slopes were examined. Such analyses were conducted for each of the relationships that identified a significant interaction using the moderated regression analysis. These results are presented in Table 3. Subgroups were formed by splitting organizational climate at its median (median=185.50) and creating favorable and unfavorable climate groups.

The relationship between job complexity and job satisfaction as a function of organizational climate suggests that when climate is perceived as being unfavorable, job complexity is an effective predictor of job satisfaction. However, when climate is seen as favorable, job complexity explains little variance in job satisfaction. It appears that as climate was perceived as unfavorable, employees were more satisfied if they had challenging work compared to those with less challenging or complex work. It seems that challenging work could compensate for a poor work environment, but it had little impact if the climate was favorable. Furthermore, the specific characteristics of the job that explained these results were task identity and autonomy.

Table 3
Subgroup Correlation and Regression Analysis Results
for Significant Moderator Effects^a

Relationship	Moderator		Difference
	Low Climate	High Climate	
<i>Job complexity–job satisfaction</i>			
Subgroup correlation	.332**	-.011	1.68** ^b
Subgroup slope	.094	-.002	3.03*** ^c
Subgroup mean	4.11	4.92	
Subgroup intercept	3.32	4.95	
<i>Task identity–job satisfaction</i>			
Subgroup correlation	.335***	-.006	1.77*
Subgroup slope	.475	-.004	2.25**
Subgroup mean	3.95	4.37	
Subgroup intercept	2.24	4.94	
<i>Autonomy–job satisfaction</i>			
Subgroup correlation	4.18***	-.011	2.15**
Subgroup slope	.554	-.009	2.62**
Subgroup mean	4.01	4.66	
Subgroup intercept	1.89	4.96	

^aSubgroup sample size=47.

^bThe significance of the difference between the subgroup correlation coefficients is examined with a Z test after applying Fisher's *r* to *z* transformation.

^cThe significance of the difference between the subgroup regression coefficients is examined with a *t*-test (*df*=90) (Arnold, 1982).

**p* < .10

***p* < .05

****p* < .01

Discussion

The present study intended both to examine the potential moderating effects of organizational climate on the job complexity-job satisfaction relationship and to test two competing perspectives concerning the form of the work content-work context interaction. The job design literature has been clear in suggesting that a favorable climate is necessary for job redesign efforts to be successful (Hackman & Oldham, 1980; Oldham & Hackman, 1980). To date, however, measures of satisfaction with aspects of the work context, and not climate per se, have been used in job design research. The present results demonstrate support for the belief that organizational climate moderates the relationship between job complexity and satisfaction. However, caution should be exercised in interpreting these results as strong support. In light of the exclusive reliance on self-report measures from one source and the small incremental variance explained by the interaction terms (as examined with step *F* tests), the results of the present study more appropriately should be viewed as moderate in nature. Studies that employ all self-report data have raised concern among organizational researchers. Critics of the job characteristics model in particular have argued that obtained relationships between job characteristics and work outcomes are attributable largely to common method variance (Roberts & Glick, 1981). However, a recent study sought to address this concern of whether many of the relationships obtained in job design research were real or artifactual. Jenkins, Glick, and Gupta (1983) provided evidence that job characteristics-work outcome relationships obtained from both observation and self-report data were relatively independent of method factors. Furthermore, method variance is most problematic when examining direct relationships between variables. The examination of interaction effects using moderated regression analysis should not be as seriously influenced by the self-report nature of the data. Future research might examine these notions with objectively measured context variables to see if the present results are supported.

Another purpose of this study was to test two competing models concerning the moderating role of work context in job design research. The Oldham model views the work content as the major source of job satisfaction, whereas a favorable work context serves as a necessary but not sufficient condition. The Champoux model portrays work content and context as substitute or alternative influences on satisfaction. The results of this study provide support for the Champoux model. Under conditions of unfavorable climate or work context, the slope coefficients were significantly larger than they were under conditions of a favorable context, and the subgroup correlation between job complexity and job satisfaction under low climate was significantly different from zero. Thus, job complexity was a source of satisfaction when the work climate was perceived to be unfavorable. However, when the climate was favorable, the nature of the job did not predict job satisfaction effectively.

The issues raised in the present study, though not receiving strong support, seem sufficiently compelling to warrant further investigation into the way the work context influences the relationship between content and affective reactions. Any potential implications of these results for job design interventions are premature to propose at this point but await more definitive clarification of the issues under study.

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THE EFFECTS OF FULL-TIME VERSUS PART-TIME EMPLOYMENT STATUS ON ATTITUDES TOWARD SPECIFIC ORGANIZATIONAL CHARACTERISTICS AND OVERALL JOB SATISFACTION

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In recent years approximately one out of every five employed individuals was a part-time employee (Terry, 1981). An extensive body of information recently has been accumulated that describes the demographic characteristics of part-time employees. Surveys have indicated that younger workers, individuals under age 25, and females are heavily represented in the ranks of part-time workers (Deutermann & Brown, 1978; Owne, 1978). Also, the large majority of part-time employees (80 percent) have been voluntary part-time workers—they choose to work weeks of less than 35 hours (Owen, 1978).

In contrast to the well-documented demographic characteristics of part-time employees, little is known about the subjective employment experience of part-time workers. In a recent review of the literature, Rotchford and Roberts (1982) revealed that the psychological characteristics, attitudes, and behaviors of part-time employees have been relatively ignored. Two studies (Cannon & Nothorn, 1971; Hom, 1979) examined behavior and attitude differences among different categories of part-time employees, and three additional investigations compared full-time and part-time employee attitudes (Hall & Gordon, 1973; Logan, O'Reilly, & Roberts, 1973; Miller & Terborg, 1979).

Hall and Gordon (1973) surveyed college-educated women with varying work and home roles. Part-time employed women expressed less career satisfaction and more role conflict and overload than did women employed full time. The researchers suggest that the difference between part-time and full-time employees was as distinct as that between those who were employed and those who were not. Logan et al. (1973), investigating the job satisfaction of full-time and part-time female hospital employees, reported no mean differences between part-time and full-time employees on level of satisfaction, but they did find response pattern differences. Job satisfaction tended to be a more homogeneous concept for full-time than for part-time employees. Miller and Terborg (1979), surveying employees of a retail merchandising organization, reported findings contrary to those of the Logan et al. (1973) study. Part-time employees were less satisfied with work, benefits, and the job in general. These results remained after controlling for the effects of employee sex and tenure.

This scarcity of attitudinal and behavioral data on part-time employees is troubling. Werther, in a paper that identified the merits of offering part-time employment opportunities from an organizational viewpoint, stated that "practitioners often avoid this resource because of widely held misconceptions about the availability, reliability, and ability of part-time personnel" (1975, p. 13). Werther goes on to suggest that the utilization of part-time employees offers organizations a number of possible advantages. Included in his list of advantages are increased scheduling flexibility, lower labor costs, potential reduction in turnover costs, increased employment stability, and aid in meeting affirmative action goals. Additional information about the attitudes and behaviors of part-time employees is needed to dispel any misconceptions and to support these suggested organizational advantages. Also, this additional research may suggest that there should be a difference in the management of part-time workers and full-time employees.

The purpose of the present study was to continue and extend the study of part-time employees by comparing their attitudes toward specific organizational characteristics and their feelings of overall job satisfaction with those of full-time employees. Rather than measuring satisfaction with general job facets, as has been done in previous research, the present study compared the attitudes of part-time and full-time employees toward specific organizational characteristics by assessing their perceptions of these characteristics. Overall job satisfaction also was measured.

Method

Questionnaires were distributed by the hospital administration to the 397 employees of an 80-bed medical rehabilitation hospital. On completion of the questionnaire, subjects were asked to return it to a collection box located at the hospital's admissions desk. The subjects' responses were confidential in that no one associated with the hospital had access to individual survey responses.

After three weeks, usable questionnaire responses had been returned by 250 employees (63 percent); 182 subjects reported their employment status as being full time, and 68 percent were part-time workers (i.e., worked less than 35 hours per week). Chi-square tests of independence indicated that the subject's sex, tenure with the hospital, and age were not related to his or her employment status. Comparisons of those employees who returned the survey with those who did not indicated that the subject sample was representative of the hospital population in terms of employment status (sample=27.2 percent part time, population=35.9 percent part time), sex (sample=23.6 male, population=23.7 percent male), and years of employment at the hospital (sample=5.4 years, population=5.8 years).

Dependent Variables. The major portion of the present survey was comprised of the items from the Litwin and Stringer (Form B) (1968) climate questionnaire. This questionnaire consists of 50 statements describing various aspects of an organization. In this research, certain statements were reworded

very slightly to fit the rehabilitation hospital's overall environment. According to Litwin and Stringer (1968), the questionnaire includes nine separate a priori scales. However, factor analytic investigations of the questionnaire by Sims and LaFollette (1975) and Muchinsky (1976) did not result in the 9-scale factor structure and indicated that a number of the a priori scales were unreliable. Based on these previous findings, the researchers decided to factor analyze the responses of the present group of subjects.

Subject attitudes toward three group processes (Myers, 1979) also were determined. Group processes are characteristics of interactions among group members. Three items assessed employee attitudes toward the level of *trust* found in the hospital. Employee responses to three items also were used to measure employee feelings about the level of *cooperation* existing in the hospital. Finally, two items measured employee feelings concerning the distribution of *power* in the hospital. The internal consistency reliabilities (coefficient alphas) of the trust, cooperation, and power scales were .59, .51, and .56, respectively. Although relatively low, these reliabilities meet Nunnally's (1978) suggestions that constructs in the early stages of research development may have reliabilities as low as .50 and still be viewed as acceptable.

Overall job satisfaction was assessed by four items taken from the *Survey of Organizations* (Taylor & Bowers, 1972). The internal consistency of the satisfaction scale was .85.

Results

The matrix of item correlations that resulted from subjects' responses to the Litwin and Stringer (1968) questionnaire was factor analyzed with communality estimates (squared multiple correlations) entered on the diagonal of the correlation matrix. Three factors were rotated to an orthogonal varimax criterion of simple structure. Individual factors were identified by those items that loaded highly ($\pm .40$) on one, and only one, of the factors resulting from the rotation. Factor-based scores for each subject were obtained by averaging his or her response to the items that composed each factor.

Table 1 summarizes the results of the 3-factor solution to the factor analysis of the subjects' responses to the Litwin and Stringer climate questionnaire (1968). The table provides the names of the three extracted factors, a brief description of individuals scoring highly on the factors, and the eigenvalues and reliabilities (coefficient alpha) of each factor. Factor 1, participative decision making and risk taking, consisted of five items and accounted for 6.6 percent of the variance associated with the subjects' responses to the climate questionnaire. Factor II, organizational structure, policies and reward system, was a large factor. It was comprised of 14 items and accounted for 11.6 percent of the variance. Finally, interpersonal relations and support, the third factor, included eight items accounting for 9.5 percent of the variance. The average correlation (\bar{r}), calculated using an r -to- z transformation, among the factors obtained from the Litwin and Stringer questionnaire and

Table 1
Factors Derived from the Litwin and Stringer
Organizational Climate Questionnaire

<i>Factor Name</i>	<i>Description of High Scoring Individuals</i>	<i>Eigenvalue^a</i>	<i>Reliability^b</i>
I. Participative decision making and risk taking	Perceived the hospital administration as allowing participation in decision making and as willing to take moderate risks.	3.31	.54
II. Organizational structure, policies, and reward system	Perceived the organizational structure and policies to be clear and impartial and perceived the reward system to be fair.	5.78	.86
III. Interpersonal relations and support	Perceived relations among co-workers to be warm and supportive.	4.74	.73

^aEigenvalues for rotated factors.

^bReliability estimates are coefficient alphas.

the other dependent variables was .38, indicating that the variables were somewhat interdependent.

Because of the degree of intercorrelation among the attitude variables, a multivariate analysis of variance (MANOVA) was used to test for the effects of the subjects' employment status. The MANOVA yielded a significant overall effect for employment status ($F=2.16, p<.04$). The estimate of the magnitude of effect, calculated using Tatsuoaka's formula (Tatsuoka, 1971), was .062. The significant MANOVA result was followed by univariate analyses of variance, which were used to investigate further the effects of employment status (Spector, 1977).

The results of the univariate analyses of variance testing for the effects of subject employment status are shown in Table 2. This table reports the means and standard deviations of the attitudinal variables for both full-time and part-time employees, the F value obtained in each one-way ANOVA, and the ω^2 estimate of effect size. Employment status had a significant effect on four of the seven dependent variables. Part-time employees had more favorable attitudes than full-time workers toward the following organizational characteristics: organizational structure, policies, and reward system

Table 2
Means and Standard Deviations for Climate Factor Scores,
Group Process Variables, and Job Satisfaction
for Full-Time and Part-Time Workers

	<i>Full Time</i>		<i>Part Time</i>		<i>F</i>	<i>ω^2</i>
	<i>\bar{X}</i>	<i>S.D.</i>	<i>\bar{X}</i>	<i>S.D.</i>		
Participative decision making and risk taking	3.72	.89	3.76	.96	.49	
Organizational structure, policies, and reward system	3.72	.88	4.23	.95	12.92**	.046
Interpersonal relations and support	4.79	.84	4.94	.81	1.70	
Trust	4.07	1.01	4.48	1.13	8.38**	.029
Cooperation	5.39	.92	5.54	.86	2.21	
Power	3.66	1.22	4.10	1.08	5.98*	.020
Satisfaction	5.22	1.08	5.60	.96	6.55**	.022

* $p<.05$

** $p<.01$

($F=12.92$, $p<.01$); the existing level of trust among organizational members ($F=8.38$, $p<.01$); and the distribution of power ($F=5.98$, $p<.05$). Additionally, the part-time workers reported a higher level of overall job satisfaction than did full-time employees ($F=6.55$, $p<.01$).

The significant effects remained after the effects of educational level and degree of involvement in patient care were partialled out using an analysis of covariance procedure. Degree of involvement could be thought of as a substitute for job type. Employees directly involved in patient care tended to be professionals (e.g., nurses, occupational therapists, physical therapists, physicians, psychologists); the majority of those indirectly involved in patient care were nonprofessionals (e.g., maintenance workers, food service workers, clerical workers). As mentioned previously, a subject's employment status was unrelated to his or her sex, age, and tenure with the hospital.

Discussion

The results of the MANOVA suggested that full-time and part-time employees differed on the dependent variables. Examination of the ANOVA F tests revealed that the attitudes of part-time workers were different from those of the full-time employees on four of the variables that were studied. Part-time employees had more favorable attitudes toward the organizational structure, policies, and reward systems; the level of trust among organization members; and the distribution of power in the hospital than did their full-time counterparts. Part-time employees also reported higher levels of overall job satisfaction. No differences were found on employee attitudes toward the amount of participative decision making and risk taking, the nature of the interpersonal relations and support, and the level of cooperation in the hospital.

Several theoretical frameworks could be applied on an ad hoc basis to explain the results of the present study. Logan et al. (1973) suggest that a frame of reference notion provides an explanation for the differences they found between part-time and full-time employees. According to this view, one's general adaptation level, which affects his/her attitudes, is determined by his/her past experiences and future expectations. Because of the number of jobs available to them and the degree to which they are involved in the functioning of the organization's social system, part-time and full-time workers may not have the same frame of reference. Part-time workers' expectations concerning what they are likely to find in other part-time work likely affect their view of their present jobs. The same is true for full-time employees. Lower initial job expectations by part-time employees (based on previous experience with part-time work) may explain their more favorable attitudes toward specific organizational characteristics. Future research should assess and compare the job expectations of full-time and part-time employees.

An alternative explanation for the part-time employees' more favorable attitudes toward specific organizational characteristics is that, because of

a lack of involvement in organizational functioning, they do not possess enough information concerning organizational problems and politics to express negative attitudes. Miller and Terborg (1979) offer the theoretical framework of partial inclusion (Katz & Kahn, 1978) as a useful mechanism in the explanation of employment status differences. The partial inclusion concept suggests that people are involved in the functioning of social systems on a fractionated or partial basis. Part-time employees may be less included than full-time employees in the organization's social system. This lack of inclusion may result in lesser amounts of knowledge concerning organizational functioning.

The part-time employees also reported a higher level of overall job satisfaction than did the full-time employees. This result differs from earlier research: Logan et al. (1973) found no significant differences in level of job satisfaction between full-time and part-time employees, and Miller and Terborg (1979) reported a lower level of satisfaction for part-time employees. Miller and Terborg (1979) utilized Goodman's (1977) work on job satisfaction and social comparison processes as an explanation for the differences in job satisfaction they found between full-time and part-time employees. According to Goodman, identical organizational conditions may be responded to differently, depending on the particular reference group chosen for comparison. The reference group used by part-time employees may have been other part-time employees, both within and outside the hospital. The full-time workers, on the other hand, may have used other full-time employees as their reference group.

This interpretation could explain the results of the present study. Unlike part-time employees in many other organizations who receive few, if any, benefits as compared to their full-time counterparts (Gable & Hollan, 1982), the part-time employees in the present study received benefits comparable to those of the full-time employees. Although they receive reduced health insurance benefits and retirement insurance coverage, the part-time workers in the present sample do receive sick pay, paid holidays, and annual leave benefits equivalent to those received by full-time employees. If the part-time workers were using other part-time workers, who may not be receiving benefits, as their reference group, their heightened satisfaction is understandable.

The present study has several limitations. First, several of the dependent variable scales had only marginal reliabilities. Any statements based on these scales must be made with caution. Secondly, the generalizability of the results of the present study is restricted by the nature of the sample. The part-time hospital employees received several fringe benefits and occupied positions of high responsibility. This is unlike the nature of most part-time employment (Owen, 1978). Additionally, all the measures used in the study were self-report in nature. This leads to common-method variance, which may distort the results of analyses investigating the relationships among the variables. Finally, the study did not take into account the life styles of the part-time employees. Whether they were moonlighting, taking part-time

employment until full-time employment arose, or voluntarily working part time may affect the attitudes of part-time employees toward their work.

Finally, though statistically significant effects of employment status were obtained for variables, the estimates of effect size (ω^2) were relatively small. The results should be viewed as another data point in the developing knowledge about distinctions between full-time and part-time employees. Accumulating results indicate that employment status should be considered in analyses of employee attitudes and behaviors, although no consistent pattern of differences is yet apparent.

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THE EFFECT OF KEY BEHAVIOR DISTINCTIVENESS ON GENERALIZATION AND RECALL IN BEHAVIOR MODELING TRAINING

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The effectiveness of behavior modeling training (Goldstein & Sorcher, 1974), which was developed based on the work of Bandura (1971, 1977), has been demonstrated by several researchers (Kraut, 1976; Latham & Saari, 1979). Behavior modeling consists of five components: modeling, retention processes, behavioral rehearsal, social reinforcement, and transfer of training (Decker & Nathan, in press).

Several studies evaluating the behavior modeling components (McFall & Twentyman, 1973; Stone & Vance, 1976) have indicated that modeling may be the weakest component of behavior modeling. Decker (1980, 1982) has shown that the efficacy of the modeling component can be enhanced by including retention aids (e.g., written descriptions of the key behaviors—*learning points*, instructions to engage in mental rehearsal, instructions to rewrite learning points). His research raises the issue of why these retention aids contribute to behavior change and thus serves as a foundation for further investigation of the retention processes.

The study of human learning and memory has been addressed by many researchers with emphasis on processes such as encoding (i.e., converting information into a code in memory) and retrieval (i.e., searching for and recovering the code from memory). Craik and Lockhart (1972) suggested the idea of "depth of processing" to describe differences in the way information is encoded and subsequently remembered. For example, if one looks up a telephone number and keeps repeating it until it is dialed, processing probably would be shallow and any interruption could cause forgetting.

It appears that whether an item is deeply processed in memory may be affected by both the contrastive value of the stimulus item and the meaningfulness of that item. It is possible to imagine a situation in which a stimulus item would be distinctive (e.g., an abstract red shape presented with several abstract black shapes) but would lack meaningfulness. In such a situation, retrieval of the distinctive item from memory would be difficult. It appears important, therefore, to create distinctiveness in such a way that meaningfulness also is increased or at least not diminished.

According to the depth of processing argument, key behaviors appearing in the modeling stimulus must be distinctive and meaningful in order to be identified and subsequently remembered. Distinctiveness could be created in several ways: (1) display the behaviors out of context, (2) exaggerate the behaviors, (3) repeat the behaviors frequently, and/or (4) include written learning points with the behavioral model. However, as Anderson (1978) has suggested, meaningfulness also must be considered. He argues that attaching verbal labels to images may increase meaningfulness and also may provide access to the mental representation. This would argue for the use of written learning points in conjunction with the visual modeled performance. Placing the key behaviors out of context, exaggerating them, and/or repeating the key behaviors may detract from meaningfulness. These strategies also may lower attention to the modeling film.

Consequently, these studies were designed to evaluate the effect of key behavior distinctiveness on both generalization (i.e., can subjects demonstrate the key behaviors while role playing a similar situation?) and recall (i.e., can subjects remember and write down the learning points?). It was hypothesized that attaching labels will enhance the distinctiveness of naturally low distinctive items. It also was hypothesized that as distinctiveness is increased, by closely linking learning points and key behaviors, generalization will be facilitated. It also was anticipated that recall would be facilitated by seeing the learning points (with or without the model). Subjects who only saw the model were expected to have difficulty identifying the important behaviors; thus they would have poor recall.

Method and Results

Overview. A pretest was conducted to determine which of two possible modeling displays was most suitable for the studies. Study 1 was conducted to determine perceived key behavior distinctiveness. Subjects were asked to view the videotape chosen in the pretest, recall the key behaviors they saw in the performance, identify the key behaviors seen in the performance from a longer list, and finally to rate the key behaviors on distinctiveness. Study 2 investigated the effect of key behavior distinctiveness on generalization and recall.

Pretest. Pretest subjects were 19 students from an industrial psychology class. All subjects volunteered for the study and were randomly assigned to view one of two videotapes. Two videotapes involving "assertiveness training" were evaluated to determine the following: (1) Could subjects view the

tapes and identify the key behaviors? (2) Given a list of the learning points, could subjects find where they were depicted on the tape? (3) Based on the number of subjects who could identify the behavior, how distinctive was each behavior? Eight subjects viewed tape 1, and 11 subjects viewed tape 2.

Tape 1 was eliminated because subjects did not agree on where any of the key behaviors occurred. Subjects who viewed tape 2 were in close agreement about the location of the key behaviors, and it was deemed an adequate display. Although subjects who saw tape 2 were able to pick out the key behaviors when supplied with the learning points, they were not able to pick all of them out from just seeing the model. Only one key behavior (repeat request), hypothesized a priori to be highly distinctive because it was repeated frequently on the videotape, was detected (7 out of 11 subjects). Of the remaining six key behaviors, only one was detected when students viewed the tape alone.

The modeling display (tape 2) consisted of a woman (i.e., the model) returning a defective can of paint to a paint store and assertively requesting a refund from a clerk. The modeling stimulus included the attentional processes outlined by Bandura (1977): the model was similar to the subjects, the display was clear and free of extraneous distractions, and the model was positively reinforced for the modeled performance. In addition, pilot testing demonstrated that the subject pool had low baseline skills in assertiveness with no significant race or sex differences.

The pretest (and subsequent pilot testing) paved the way for the study by demonstrating that key behavior distinctiveness varied. This determination of distinctiveness is relative and would not generalize beyond this sample. "Calmly repeat your request over and over" (*repeat request*) appeared to have high distinctiveness; "offer a new way to solve the problem" (*new solution*), "set a time to resolve the problem" (*set time*), and "agree that you made a mistake if you actually did" (*mistake*) were moderately distinctive. Low in distinctiveness were "agree with any truth in the person's statement" (*truth*), "don't answer leading questions" (*leading question*), and "state your feelings" (*feelings*).

Study 1. The subjects were 54 students from business school courses. All subjects participated as a course requirement; 21 were males and 33 were females. Group 1 subjects ($N=25$) saw the videotape without learning points; group 2 subjects ($N=29$) saw the videotape with interspersed learning points. Each group viewed the modeling display and then was asked to perform three tasks in order: recall and write out the rules that they thought were underlying the behavior of the model, identify the seven key behaviors from a list of 23 key behavior statements, and rate the distinctiveness of the seven actual key behaviors on a 5-point Likert-type scale. For the latter task, distinctiveness was defined as "the degree to which one may distinguish something from its surroundings. In other words, how able are you to pick that guideline out when watching the videotape?"

The first task resulted in a list of behaviors/rules that the subjects thought represented the key behaviors of the modeled performance. Two judges

(graduate students) tabulated the results. For group 1 subjects, only *repeat request* ($N=16$) and *mistake* ($N=9$) were identifiable from the 105 possible key behaviors listed. For group 2 subjects, all 7 key behaviors were listed, with 151 entries listed correctly out of 159 total entries.

In the second task, students were asked to identify the actual key behaviors from a list of 23 possible key behaviors. They were not told the actual number of key behaviors. The results of this task are shown in Table 1 and suggest that the inclusion of interspersed learning points enhanced the distinctiveness of key behaviors.

Table 1
Students Choice of Key Behaviors from a List of 23 Possible Choices (Study 1)

Key Behavior	Session 1 ($N=25$)	Session 2 ($N=29$)
	(Modeled Performance Only)	(Interspersed Learning Points and Modeled Performance)
Repeat request	25	29
New solution	9	28
Set time	16	29
Truth	20	27
Mistake	18	29
Leading question	6	28
Feelings	8	19

In the third task, the students were asked to rate the distinctiveness of the seven actual key behaviors. The results of this analysis can be seen in Table 2. The results clearly show that interspersing the learning points in the videotape so that they were seen immediately before the respective key behavior increased the distinctiveness of *new solution*, *set time*, *truth*, and *leading question*.

Table 2
Means and Standard Deviations of Student Ratings of Key Behavior Distinctiveness (Study 2)

Key Behavior	Session 1 (N=25) (Modeled Performance Only)		Session 2 (N=29) (Interspersed Learning Points and Modeled Performance)		t-test
	Mean ^a	SD	Mean	SD	
Repeat request	1.12	.33	1.07	.26	.613
New solution	2.92	1.26	2.03	1.18	2.62**
Set time	2.32	1.49	1.52	1.02	2.27*
Truth	3.00	.58	2.31	.89	3.42**
Mistake	2.72	.89	2.34	1.00	1.42**
Leading question	4.00	.82	2.31	1.17	6.95***
Feelings	2.72	1.21	2.66	1.26	.20

^a1 = extremely distinctive, 5 = not distinctive.

* $p < .05$

** $p < .01$

*** $p < .001$

It was shown in the pretest that the key behaviors varied in distinctiveness before attaching learning points (natural distinctiveness). Study 1 showed that the attachment of learning points increased perceived distinctiveness of those key behaviors with low and moderate natural distinctiveness (induced distinctiveness). Consequently, it would be expected that if distinctiveness enhances attention to and retention of modeled events, subjects shown only the modeled performance would recall and reproduce naturally high distinctive key behaviors (e.g., *repeat request*) better than naturally low distinctiveness key behaviors (e.g., *leading questions*). Subjects who were shown the modeled performances with learning points attached would be expected also to recall and reproduce the naturally low and moderate distinctive key behaviors.

Study 2. This study employed 52 students from psychology classes (general and industrial). All subjects volunteered for the study and were randomly assigned to condition; 21 males and 31 females participated. All subjects were shown a videotaped display that included the experimental instructions and one of four conditions: learning points only, model only, combined (i.e., learning points and model), and interspersed (i.e., model with learning points interspersed). Tape 2 was used.

Where learning points were seen, they appeared individually on the tape for a duration of approximately 30 seconds. Subjects who saw the learning points only condition viewed the complete sequence of seven learning points twice with a brief pause between them. Subjects in the model only condition saw the modeled performance twice and no learning points. Combined subjects saw the model, the sequence of learning points, and the model again. Finally, subjects in the interspersed condition saw the model, the sequence of learning points, and a version of the model in which each learning point was inserted in the display immediately preceding the depiction of the key behavior.

Immediately after the subject saw a taped condition, the experimenter handed the subject a card describing a similar situation (i.e., a customer was not satisfied with an automobile repair job) and was told that he would role play that situation with the experimenter while being videotaped. Two experimenters (each ran half of the subjects), who were blind to the research hypotheses, conducted the experiment. The experimenter used a script while acting as an automobile service department attendant, and the subject acted out the part of a dissatisfied customer. The role play sequence was videotaped and later scored (generalization score) by two trained raters (i.e., eight hours instruction on rating process and this particular task) who were blind to hypotheses and condition. The raters used a checklist to score whether a behavior had occurred. After role play, the subjects were given a questionnaire asking them to write down the key behaviors they could remember (i.e., the immediate recall task). The model only subjects were instructed to recall any important behaviors they had seen on the tape. Two additional trained raters (also blind to hypothesis and condition) scored the recall task (i.e., how many correct key behaviors were remembered regardless of order).

Table 3
Means and Standard Deviations of Generalization Scores and
Overall Generalization Score by Condition (Study 2)
(*N* = 13)

	Repeat Request		Truth		Mistake		Leading Question		Feelings		New Solution		Set Time		Overall	
	Mean ^a	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Learning points only	2.04	.72	1.00	.74	.15	.55	.38	.46	.15	.32	1.42	.81	.38	.77	5.22	4.37
Model only	2.42	.34	1.73	.90	.38	.65	.62	.85	.35	.47	2.12	.51	1.50	.76	9.12	4.48
Combined	2.54	.47	2.88	.30	1.57	.49	1.19	.56	.54	.63	2.62	.51	1.85	.38	13.19	3.34
Interspersed	2.50	.41	2.73	.60	.92	.76	1.54	.43	.85	.72	2.42	.61	1.77	.60	12.73	4.13

^a3 = positive response; 0 = negative response.

Table 4
Means and Standard Deviations of Recall Scores and
Overall Recall Score by Condition (Study 2)
(*N* = 13)

	Repeat Request		Truth		Mistake		Leading Question		Feelings		New Solution		Set Time		Overall	
	Mean ^a	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Learning points only	1.00	.00	.65	.47	.69	.48	.77	.44	.46	.52	.54	.52	.54	.52	4.65	2.95
Model only	.31	.38	.00	.00	.00	.00	.00	.00	.00	.00	.04	.14	.00	.00	.35	.52
Combined	1.00	.00	.73	.44	.58	.49	.54	.52	.08	.28	.42	.49	.38	.51	3.73	2.73
Interspersed	.73	.39	.46	.48	.58	.49	.46	.52	.23	.44	.58	.49	.73	.44	3.77	3.25

^a3 = positive response; 0 = negative response.

Generalization and recall scores (Tables 3 and 4) were calculated by taking the mean of two raters' scores on each dimension. An overall score for both generalization and recall was calculated by summing the means of the dimensions. Interrater agreement was assessed by correlating the two raters' scores on each dimension. Interrater agreement on the generalization dimensions ranged from .94 to .99; recall dimensions ranged from .66 to 1. Interrater reliability of the summed dimension scores was .77 for generalization and .90 for recall. The means and standard deviations of the dependent variables are presented in Table 3.

To examine the generalization measure, a multivariate analysis of variance with a priori contrasts between conditions was performed. A summary of the univariate results of this analysis is reported in Table 5. A multivariate test of significance using Wilks' lambda criterion was significant; $F = 5.15 (21, 121)$, $p < .0001$. The analysis revealed that seeing the learning points and a form of the model (i.e., model or interspersed model) significantly facilitated generalization for the dimensions (i.e., *truth*, *mistake*, *new solution*, *leading question*) shown to have moderate to low natural distinctiveness. For one of the least distinctive dimensions, *feelings*, scores for interspersed subjects were significantly greater than for the control subjects, model only. Some of the dimensions with moderate distinctiveness (i.e., *new solutions*, *set time*) were significantly facilitated by all conditions that included the model as opposed to the learning points only condition. The dimension with highest distinctiveness (i.e., *repeat request*) was less affected by condition; however, generalization scores still were significantly greater for subjects who saw a form of the learning points and model than for those who saw the learning points only. There were no significant differences between combined scores and interspersed scores except for the dimension *mistake*.

To examine the recall measure, a one-way multivariate analysis of variance with a priori contrasts between conditions was performed. A summary of the univariate results is reported in Table 6. A multivariate test of significance using Wilks' lambda criterion was significant; $F = 3.88 (21, 121)$, $p < .0001$. The analysis revealed that seeing the learning points alone or with a model significantly facilitated immediate recall, and subjects who saw the model only condition demonstrated poor recall.

Discussion

The results of this study indicate that increasing key behavior distinctiveness by the inclusion of written learning points on the visual model enhances generalization, especially with low distinctiveness key behaviors. The pretest showed that subjects were unable to identify key behaviors (except *repeat request*) from simply seeing the model. However, subjects could identify key behaviors with learning points attached. This study demonstrated further that subjects who saw both the learning points and a form of the model had significantly higher generalization scores on low distinctiveness dimensions (e.g., *leading question*) than those who saw the model only.

Table 5
Results of Multivariate Analysis of Variance for Generalization,
Including a Priori Contrasts (Study 2)

Source of Variation	Repeat Request			Truth			Mistake		
	df	MS	F	df	MS	F	df	MS	F
Total	51	—	—	51	—	—	51	—	—
Condition	3	.68	2.65	3	10.22	22.62***	3	5.21	13.43***
Learning point vs. model	1	.96	3.73	1	3.47	7.68**	1	.35	.89
Learning point vs. others	1	1.96	7.61**	1	20.46	45.28***	1	6.36	16.40**
Learning points vs. combined and interspersed	1	2.00	7.76**	1	28.32	62.67***	1	10.41	26.85***
Model vs. combined	1	.09	.34	1	8.65	19.15***	1	9.24	23.83***
Model vs. interspersed	1	.04	.15	1	6.50	14.38***	1	1.83	4.86*
Model vs. combined and interspersed	1	.08	.31	1	10.05	22.24***	1	6.49	16.74***
Combined vs. interspersed	1	.009	.04	1	.15	.34	1	2.77	7.17*
Error	48	.26	—	48	21.69	—	48	.33	—

Source of Variation	Leading Question			Feelings			New Solution		
	df	MS	F	df	MS	F	df	MS	F
Total	51	—	—	51	—	—	51	—	—
Condition	3	3.62	10.13***	3	1.13	3.67*	3	3.56	9.23***
Learning point vs. model	1	.35	.97	1	.24	.78	1	3.12	8.08**
Learning point vs. others	1	5.21	14.57**	1	1.75	5.66*	1	9.01	23.39***
Learning points vs. combined and interspersed	1	8.33	23.33***	1	2.51	8.15**	1	10.41	27.02***
Model vs. combined	1	2.16	6.05*	1	.24	.78	1	1.63	4.22*
Model vs. interspersed	1	5.54	15.50***	1	1.63	5.27*	1	.62	1.60
Model vs. combined and interspersed	1	4.87	13.64***	1	1.04	3.37	1	1.41	3.67
Combined vs. interspersed	1	.79	2.18	1	.61	1.99	1	.24	.62
Error	48	.36	—	48	.31	—	48	.39	—

Source of Variation	Set Time			Overall		
	df	MS	F	df	MS	F
Total	51	—	—	51	—	—
Condition	3	5.96	14.23***	3	165.76	37.37***
Learning point vs. model	1	8.09	19.33***	1	86.16	18.75***
Learning point vs. others	1	17.00	40.65***	1	367.69	82.91***
Learning points vs. combined and interspersed	1	17.55	41.96***	1	472.55	107.68***
Model vs. combined	1	.77	1.86	1	108.04	24.36***
Model vs. interspersed	1	.47	1.13	1	84.96	19.16***
Model vs. combined and interspersed	1	.82	1.96	1	128.21	28.91***
Combined vs. interspersed	1	.04	.09	1	1.38	.31
Error	48	.42	—	48	212.48	—

* $p < .05$ ** $p < .01$ *** $p < .001$

Interspersed scores were greater than combined scores on one moderately distinctive key behavior suggesting that the interspersed condition may have

Table 6
Results of Multivariate Analysis of Variance for Recall,
Including a Priori Contrasts (Study 2)

Source of Variation	Repeat Request			Truth			Mistake		
	df	MS	F	df	MS	F	df	MS	F
Total	51	—	—	51	—	—	51	—	—
Condition	3	1.39	18.65***	3	1.40	8.68***	3	1.27	7.07**
Model vs. others	1	3.54	47.51***	1	3.69	22.93***	1	3.69	20.57***
Learning points vs. combined and interspersed	1	.15	2.11	1	.06	.18	1	.11	.64
Learning points vs. model	1	3.12	41.81***	1	2.78	17.25***	1	3.12	17.36***
Error	48	3.58	—	48	.16	—	48	.18	—

Source of Variation	Leading Question			Feelings			New Solution		
	df	MS	F	df	MS	F	df	MS	F
Total	51	—	—	51	—	—	51	—	—
Condition	3	1.35	7.40**	3	.54	4.00*	3	.79	4.06*
Model vs. others	1	3.39	18.56***	1	.64	4.76*	1	2.19	11.31**
Learning points vs. combined and interspersed	1	.62	3.44	1	.82	6.10*	1	.01	.07
Learning points vs. model	1	3.85	21.05***	1	1.38	10.29**	1	1.63	8.38**
Error	48	.18	—	48	.13	—	48	.19	—

Source of Variation	Set Time			Overall		
	df	MS	F	df	MS	F
Total	51	—	—	51	—	—
Condition	3	1.25	6.96**	3	46.98	16.64***
Model vs. others	1	2.96	16.51***	1	133.85	47.41***
Learning points vs. combined and interspersed	1	.003	.021	1	.009	.00
Learning points vs. model	1	1.88	10.50**	1	120.62	42.73***
Error	48	.18	—	48	135.50	—

* $p < .05$ ** $p < .01$ *** $p < .001$

slightly facilitated identification of the low to moderate distinctive behaviors. Finally, subjects who saw only the learning points had significantly poorer generalization scores on all dimensions than those who saw a form of the model. This demonstrated, as did Latham and Saari (1979), that giving subjects the learning points alone is insufficient to elicit the desired behavior.

The recall measure showed that subjects who saw only learning points had recall scores equivalent to those seeing learning points and a form of the model. However, based on their generalization scores, learning points only subjects apparently were unable to transfer the verbal labels into behavior. Subjects who saw only the model had recall scores significantly inferior to all other conditions. In addition, a close examination of their recall responses indicated that 6 of the 13 subjects reversed one or more of the key behaviors (e.g., "never admit a mistake" instead of "agree that you made a mistake if you actually did"), even though, in some cases, they

correctly generalized the dimension. Subjects in other conditions never reversed a key behavior on the recall task. Therefore, it would seem unlikely that behavior change on the job would occur when the important behaviors either were not identified or were incorrectly identified.

The authors hypothesized that the interspersed condition would be superior to the combined condition because it was anticipated that both contrast and meaningfulness would increase as learning points and behaviors became more closely linked. However, except for *leading question* and *feelings*, the means for combined were higher than for the interspersed condition. Unfortunately, interpretability was negatively influenced because both groups saw the learning points prior to seeing the model a second time. Had the interspersed subjects seen only the interspersed model, clearer differences might have been apparent. In addition, interspersing the learning points on the second model may actually have served as interference, causing subjects to have difficulty attending to that form of the model. The two most complex behaviors (i.e., *leading question*, *feelings*) were facilitated, at least marginally, by the interspersed condition. Perhaps it would be useful to investigate another means of linking learning points and behaviors, such as the use of superimposed captions (i.e., learning points appear as captions during the depiction of each key behavior).

Both Decker (1980) and cognitive researchers (Jaccoby & Craik, 1979; Klein & Saltz, 1976) allude to the processing of the stimulus in such a way that it becomes a distinctive entity in memory. Obviously, what actually happens in memory is unclear (e.g., do humans create verbal codes, image codes, or both?), but a distinctive and meaningful stimulus should make processing easier to accomplish no matter what the final form and, thus, easier to retrieve from memory. This easy retrieval should increase the possibility of behavior change. Consequently, in creating a behavior modeling display, attaching learning points closely to the key behavior performance (especially for key behaviors that are not "naturally" distinctive) should enhance recall and the learning of new behaviors.

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DOES JOB SATISFACTION LEAD TO CONSIDERATION AND PERSONAL SENSITIVITY?¹

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There is widespread skepticism over the possibility that job satisfaction might have important causal effects on job performance, and for good reason. Vroom (1964) concluded from a review of the literature that the median correlation between satisfaction and performance was only .14. Lawler and Porter (1967) argued compellingly that the causal arrow actually runs in the other direction—when rewards are linked to performance, high performers become more satisfied because they are rewarded at higher levels. Consequently, although the idea may have intuitive and popular appeal, there is little empirical or theoretical basis for believing that people perform more effectively or produce at higher levels because they are more satisfied.

Satisfaction nevertheless might have causal effects on other kinds of job-related behavior. There is a great deal of evidence, for instance, that it is importantly implicated in the withdrawal process. Several reviews document the long tradition of research on job dissatisfaction as a predictor of turnover (Mobley, Griffeth, Hand, & Meglino, 1979; Porter & Steers, 1973; Price,

¹Data reported here were gathered under a research contract awarded to Personnel Decisions Research Institute, Minneapolis, with Marvin D. Dunnette as principal investigator.

1977), and they provide ample evidence that people who report feelings of dissatisfaction are indeed more likely to quit.

Recent research developments point to still other behavioral patterns that could be influenced by job satisfaction. Several studies have found that people who experience positive affect because something happened to put them in a good mood are more altruistic and more likely to help and to be considerate to others (Adelman, 1972; Cunningham, Steinberg, & Grev, 1980; Isen, Clark, & Schwartz, 1976; Isen & Levin, 1972; Rosenhan, Salovey, & Hargis, 1981). Although mood is conceptually and operationally different from job satisfaction, the two constructs are still intimately related. People who find their work situations satisfying should generally be in more positive moods than people who do not. Accordingly, the affective response implicit in job satisfaction would have causal effects on behaviors at work related to altruism, helping, and consideration.

Building partly from this logic, Smith, Organ, and Near (1983) reported a correlation of .31 ($p < .01$) between job satisfaction and supervisory ratings of altruism, which included items such as "helps others who have been absent," "volunteers for things that are not required," and "helps others who have heavy work loads." Similarly, Bateman and Organ reported a correlation of .41 ($p < .01$) between overall job satisfaction and supervisory ratings of "citizenship behavior," which "tapped a variety of behaviors such as compliance, altruism, dependability, housecleaning, complaints, waste, cooperation, criticism of and arguing with others, and punctuality" (1983, p. 589). These studies show that people who report high levels of job satisfaction are more likely to behave in ways that are important for the organization even though their actions might not necessarily contribute directly to higher levels of their own job performance or productivity.

The purpose of this study is to extend these findings by exploring relationships between job satisfaction and other behavioral patterns related to altruism and consideration at the workplace.

Method

This study was conducted in a large utility company as part of a broader study designed to evaluate the effectiveness of a training program for managers.

Measures. Job satisfaction was measured by a 10-item instrument that asked how satisfied people were with aspects of the job such as pay, kind of work, supervisor, co-workers, and the company as a whole. Each item was rated along a 5-point scale with alternatives from *very dissatisfied* to *very satisfied*.

Behavioral patterns were measured by nine graphic rating scales. Each ranged from 1 to 9 and was anchored at the high and low ends by a general behavioral illustration of high and low levels of the characteristics. The nine scales were *assertiveness* (ability to be forceful and poised with others), *awareness of "sexism"* (sensitivity to language or policies that might be demeaning

or unfair to women or to men), *support for nontraditionals* (understanding, concern, and encouragement for people in jobs that are nontraditional for their sex), *support for women* (concern for helping women contribute more importantly to organizational decision making), *listening orientation* (ability and willingness to listen to others), *consideration* (awareness and concern for the needs and feelings of others), *self-control* (tact, emotional control, and acceptance of criticism), *self-disclosure* (being open and candid about own feelings, emotions, and personal concerns), and *self-acceptance* (awareness and acceptance of own feelings, needs, and actions).

The nine scales were factored with rotation to the varimax criterion. This procedure yielded three factors with eigenvalues larger than 1. One factor included awareness of sexism, support for nontraditionals, and support for women. These three ratings were summed to form one score labeled *anti-sexism*. A second factor included listening orientation, consideration, and self-control. They were combined to form a score labeled *consideration*. Self-acceptance and self-disclosure loaded on the third factor and were combined to form *self-acceptance*. Loadings for assertiveness were split evenly across the three factors, so *assertiveness* was left to stand alone as a fourth rating score.

Sample and Procedure. The sample of participants included 79 managers who took part in the training program mentioned earlier and 77 others who had not yet taken part in it. There were 86 women and 70 men in this sample. (Gender was not correlated significantly with any of the variables in this report.) They completed a self-report questionnaire containing the job satisfaction measure on company time and company premises with a member of the research team present to administer materials and answer questions. They were asked to identify themselves on the questionnaire so that their supervisors could be contacted later for information that would be correlated with their questionnaire responses. Only a few chose not to identify themselves. Rating forms were then mailed to their supervisors. Largely because some supervisors did not return completed materials, ratings became available for 134 persons. The supervisory ratings were completed about one to three weeks after the self-report questionnaires were completed. Because of missing data, complete information on both job satisfaction and supervisory rating score was available for samples varying in size from 122 (for anti-sexism) to 132 (for assertiveness).

Results

Table 1 shows means, standard deviations, and reliability estimates for all variables. Three months after the training program 52 persons completed the self-report questionnaire a second time. As shown in Table 1, the test-retest reliability of the job satisfaction measure is estimated at .79. Its internal consistency estimate is .77. Supervisors rated 38 persons a second time. Test-retest estimates for the supervisory rating scores range from .41 to .79. Their internal consistency estimates range from .51 to .76.

Table 1
Correlations, Means, Standard Deviations, and Reliability Estimates

	1	2	3	4	5
1. Satisfaction	—				
2. Assertiveness	.04	—			
3. Self-acceptance	-.07	.42*	—		
4. Anti-sexism	.01	.37*	.36*	—	
5. Consideration	.27*	.30*	.31*	.35*	—
Mean	37.9	6.8	12.4	20.3	20.3
SD	5.4	1.7	2.6	3.2	3.8
Internal consistency	.77	—	.51	.70	.76
Test-retest ^a	.79	.66	.79	.41	.58

^aTest-retest estimates are derived from a subsample of 33 to 51 persons (the number varies because of missing data).

* $p < .01$ (two tailed)

Table 1 also presents zero-order correlations among all variables. Correlations between job satisfaction and supervisory ratings of assertiveness, self-acceptance, and anti-sexism hover around zero. However, job satisfaction is significantly correlated with supervisory ratings of consideration ($r = .27, p < .01$).

The training program did not have a significant effect on any of the supervisory rating measures. Its effect on the satisfaction measure approached significance ($r = .16, p = .054$). To control for the possible effects of the training program and patterns of association between the supervisory rating scores, a series of partial correlations between job satisfaction and each rating score was computed, partialling out the effects of the training program and all other rating scores. Job satisfaction was still uncorrelated with assertiveness, self-acceptance, and anti-sexism and was still significantly correlated with consideration (partial $r = .25, p < .01$) when training and the other rating scores were held constant.

Further analyses were conducted to determine whether correlations with supervisory ratings might vary for different aspects of satisfaction included in the overall measure. The 10 satisfaction items were factored with rotation to the varimax criterion. Three factors emerged with eigenvalues larger than 1. Factor 1 included satisfaction with opportunities for promotion, career progress to date, opportunities for training and development, and amount of pay. Factor 2 included satisfaction with supervision, kind of work, co-workers, and the company as a place to work. Factor 3 included satisfaction with the benefits program and policies related to Equal Employment Opportunity (EEO). Three separate satisfaction scores were computed according to items that loaded on the three factors (items were unit weighted for each score) and were correlated with the rating scores. As shown in Table 2, none of the more specific satisfaction scores was significantly correlated with supervisory ratings of assertiveness, self-acceptance, or anti-sexism. In fact, of the nine correlations in this set, seven were negative. However, the consideration rating score was significantly correlated with satisfaction scores derived from the first two factors. Its correlation with the third

Table 2
Correlations Between Supervisory Ratings and
Satisfaction Scores Derived from a Factor Analysis

<i>Satisfaction Scores</i>	<i>Supervisory Ratings</i>			
	<i>Assertiveness</i>	<i>Self-acceptance</i>	<i>Anti-sexism</i>	<i>Consideration</i>
Factor 1	-.00	-.06	-.02	.26**
Factor 2	.11	-.04	-.01	.17*
Factor 3	-.00	-.06	.15	.14

* $p < .05$ (two-tailed)

** $p < .01$ (two-tailed)

satisfaction score (benefits and EEO policies) was positive but not significant at $p < .05$. These results provide no basis for concluding that relationships between supervisory ratings and satisfaction vary importantly across different aspects of satisfaction in the overall measure.

Discussion

Feelings of satisfaction are associated with patterns of behavior at work that reflect interpersonal sensitivity and kindness—behaviors such as listening to others, showing awareness and concern for the needs and feelings of others, tact, emotional control, and acceptance of criticism. Satisfaction is not related to other behaviors such as assertiveness, anti-sexism, and self-acceptance, which do not reflect altruism and consideration so explicitly. These results are consistent with the idea that people with positive affective states at work—that is, people who are satisfied with their jobs—express their good feelings by behaving considerately and sensitively with others.

There is, of course, the possibility of another causal direction. Perhaps consideration leads to feelings of satisfaction. One way to examine this is with cross-lagged correlation analysis (Bateman & Organ, 1983). Unfortunately, complete data are available for only 23 persons on both the self-report and supervisory measures at both times—before and after the training program. The small size of this sample precludes an interpretable cross-lagged correlation analysis.

Although it cannot be ruled out, the possibility that consideration caused satisfaction in this study becomes less likely in the context of insignificant correlations between satisfaction and other behaviors that presumably are valued by the organization. If considerate people become more satisfied with their jobs because the organization gives rewards to people who behave in organizationally useful ways, the organization also should be rewarding people who behave assertively, because assertiveness also should be regarded as an important characteristic, at least among managers. But data reported here show no relationship between job satisfaction and assertiveness. Consequently, it becomes more difficult to argue that the observed relationship between satisfaction and consideration merely shows the effects of organizational practices that reward consideration more than inconsideration.

Results reported here, together with results reported by Smith et al. (1983), Bateman and Organ (1983), Adelman (1972), Cunningham et al. (1980), Isen et al. (1976), Isen and Levin (1972), and Rosenhan et al. (1981) strengthen the view that people express positive affect and job satisfaction by behaving more considerately and sensitively toward others. Interpersonal sensitivity and consideration are likely to be especially important in jobs in which success hinges on being able to provide personal services and satisfy others through personal contact. It should be important in many kinds of management jobs, for instance, and in service jobs such as health care, teaching, and direct sales. Consequently, job satisfaction might be a more important determinant of effectiveness in jobs such as those than in jobs in which personal sensitivity and consideration are not necessary for success.

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FIGURE 1
Model of Contextual Influences on Performance

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The division invites papers and symposia on health care related issues. Manuscripts and symposia examining health care constructs and/or samples of an individual, organizational, policy, etc. nature are welcome. Data and non-data based papers are appropriate. An award of \$250 will be given for the outstanding paper. **Robert Hernandez**, Health Services Administration, University of Alabama in Birmingham, 5th Floor, Webb Bldg., Birmingham, AL 35294. (205) 934-6861.

INTERNATIONAL MANAGEMENT

The division invites papers, symposia, and panel proposals related to the broad areas of international and comparative management. Topics might include, but are not limited to, the international dimensions of strategic planning, organizational behavior, organization and management theory, human resource management labor relations, and the role of the multinational corporation. An award will be given for the best competitive paper. **Richard B. Peterson**, Graduate School of Business Administration, MacKenzie Hall DJ-10, University of Washington, Seattle, WA 98195. (206) 543-7695.

MANAGEMENT EDUCATION AND DEVELOPMENT

MED invites papers and proposals for symposia, workshops, and tutorial sessions (1) demonstrating effective and/or innovative instructional methods or technology, and (2) focusing on management education or management development issues in organizations. Through the Foundation for Administrative Research, the Division will make available two externally-sponsored awards of \$500 each. One award is for the best paper in *Management Education* and one for the best paper in *Management Development*. **Bernard Keys**, Landrum Box 8152, Department of Management, Georgia Southern College, Statesboro, GA 30460. (912) 681-5216.

MANAGEMENT HISTORY

The historical development of management concepts, skills and practices is a broad area for original papers, panel discussions and symposia. Papers which focus on the role and relevance of Management History in contemporary management programs are particularly welcome. Other topics of interest include the evaluation and assessment of well- and not-so-well-known managers and their influence on current trends in improving the performance of the enterprise, and discussions of management philosophy. **John Breeze**, c/o Dean of Commerce, Saint Mary's University, Halifax, Nova Scotia, Canada B3H 3C3. (902) 466-7491 or (902) 434-9140.

MANAGERIAL CONSULTATION

Papers and symposia proposals related to the consulting process are invited. Especially appropriate are conceptual, research, and applications-based submissions highlighting interdisciplinary approaches and integrations of theory into practice. Three hundred dollars (\$300) will be awarded for the best paper. **Craig Lundberg**, Department of Management and Organization, University of Southern California, Los Angeles, CA 90085. (213) 743-2437.

ORGANIZATION AND MANAGEMENT THEORY

The division seeks papers and symposia that contribute to developing theory and research in organization and management. Symposia chairs will be asked to review competitive papers for their topics. Emphasis will be on junior faculty submissions and empirical in-progress work. Recognition awards will be given for the best competitive paper and the best paper based on a dissertation. Eligible papers must be identified as being based on a dissertation. **David Whetten**, College of Commerce, University of Illinois, Urbana, IL 61801. (217) 333-4160.

ORGANIZATIONAL BEHAVIOR

The division invites papers and symposia that contribute to the development of theory and research in organizational behavior. Submissions that focus on problems of current relevance to organizations are strongly encouraged. Two recognition awards will be given by the division: one for the best competitive paper (may be coauthored) and one for the best competitive paper based on a dissertation (dissertation must not be coauthored and should be clearly identified as a dissertation at the time of submission). **Orlando Behling**, Department of Management, Bowling Green State University, Bowling Green, OH 43403. (419) 372-0260/2946.

ORGANIZATIONAL COMMUNICATION

Research, conceptual, and theory papers as well as symposia, are invited. Topics may include, but are not limited to: communication policy/strategy, networks, feedback, negotiation, boundary spanning, and information systems. In addition, specific applications of communication concepts and theory to real world organizational problems are encouraged. The author(s) of the best paper will receive an award in recognition of superior scholarship. **Stewart L. Tubbs**, Department of Management, Boise State University, 1910 University Drive, Boise, ID 83725. (208) 385-1313/1127.

ORGANIZATIONAL DEVELOPMENT

Papers, symposia, and workshop proposals are invited on all aspects of organization development. Presentations that center on theory, research, and practice relevant to changing organizational cultures, organizational development as a route to "excellence," and the future of organizational development are encouraged. Symposia that present a variety of perspectives on a common topic, or innovative integrations of theory, research, and practice are welcomed. We are especially interested in presentations that connect research with practice in organizational development. **Marshall Sashkin**, 8708 Nightingale Drive, Seabrook, MD 20706. (202) 254-6050.

PERSONNEL/HUMAN RESOURCES

Papers and symposia are invited on all employment topics. Empirical, conceptual, and literature reviews of the impacts of personnel/human resource activities on individuals, jobs, and organizations are appropriate. These include, but are not limited to, topics such as human resources planning, performance appraisal, selection, training and development, motivation, compensation and benefits, and labor relations. Doctoral student papers are encouraged. A \$200 prize is awarded for the best competitive paper. **Timothy J. Keaveny**, Department of Business Administration, University of Wyoming, Laramie, WY 82081. (307) 766-4244/3124.

PRODUCTION/OPERATIONS MANAGEMENT

Papers and proposals for symposia, workshops, and tutorials on issues or problems in the P/OM areas are invited. In addition to the more traditional research topics, the division is particularly interested in papers which address emerging problems, interface between P/OM and other functional areas, and in-depth research case analysis. **Chan K. Hahn**, Department of Management, Bowling Green State University, Bowling Green, OH 43403. (419) 372-2946.

PUBLIC SECTOR

Papers on management or policy analysis issues in public, quasipublic, and not-for-profit sectors are welcome. In addition, studies comparing structural, environmental, and technological variables for organizations in these sectors versus the private sector are welcome. A \$100 prize will be awarded for the best competitive paper. **H. Brinton Milward**, Department of Management, University of Kentucky, Lexington, KY 40506. (606) 257-7675.

SOCIAL ISSUES

Papers and symposia are invited on all aspects of corporate involvement in social issues, and the impact of external socio-political environment on corporate strategy and behavior. Preference will be given to papers with: (1) strong theoretical and conceptual reasoning; and (2) rigorous empirical analysis. Symposia should focus on leading edge emerging issues. Sessions involving academic and practitioner inputs are encouraged. Awards will be presented to the best research paper and the best doctoral dissertation. **S. Prakash Sethi**, Department of Management, Bernard Baruch College, City University of New York, 17 Lexington Avenue, New York, NY 10010. (212) 725-7131.

WOMEN IN MANAGEMENT

Theoretical and empirical papers and symposia proposals are invited which examine significant issues facing women in organizations and/or sex differences in organizations. The Dorothy Harlow Distinguished Paper Award of \$400 and plaque will be presented to the best competitive paper advancing knowledge on women in management. **Dorothy Perrin Moore**, Department of Business Administration, The Citadel, Charleston, SC 29409. (803) 792-6968/5056.

ENTREPRENEURSHIP

The Interest group invites submissions of papers and symposia dealing with entrepreneurship—new ventures, small business management, corporate entrepreneurship, family business, and venture capital. Papers describing empirical research are especially encouraged. **John A. Pearce II**, College of Business Administration, University of South Carolina, Columbia, SC 29208. (803) 777-5990.

R&D/TECHNOLOGY/INNOVATION

This Interest group invites papers and symposia on all aspects of R&D/Technology/Innovation management. Papers addressing innovation in various types of organizations, technology transfer, R&D personnel, careers and organizations are welcome. **Ralph Katz**, Northeastern University, 304 Hayden Hall, Boston, MA 02115. (617) 437-4724.

RESEARCH METHODS

The research methods Interest group's meeting will be devoted to working sessions which are intended to develop its future focus and structure. Proposals for such working sessions are invited for, but not restricted to, the following areas: (1) how we should study organization and management subjects; (2) sociology and knowledge; (3) the role of methodology in a research methods Interest group; (4) science, the philosophy of science, and the study of managing; and (5) a working session on the design of a governance structure. **Ramon Aldag**, Graduate School of Business, University of Wisconsin-Madison, Madison, WI 53706. (608) 263-3771.

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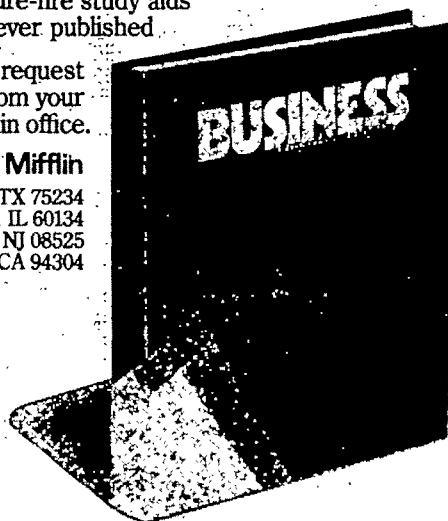
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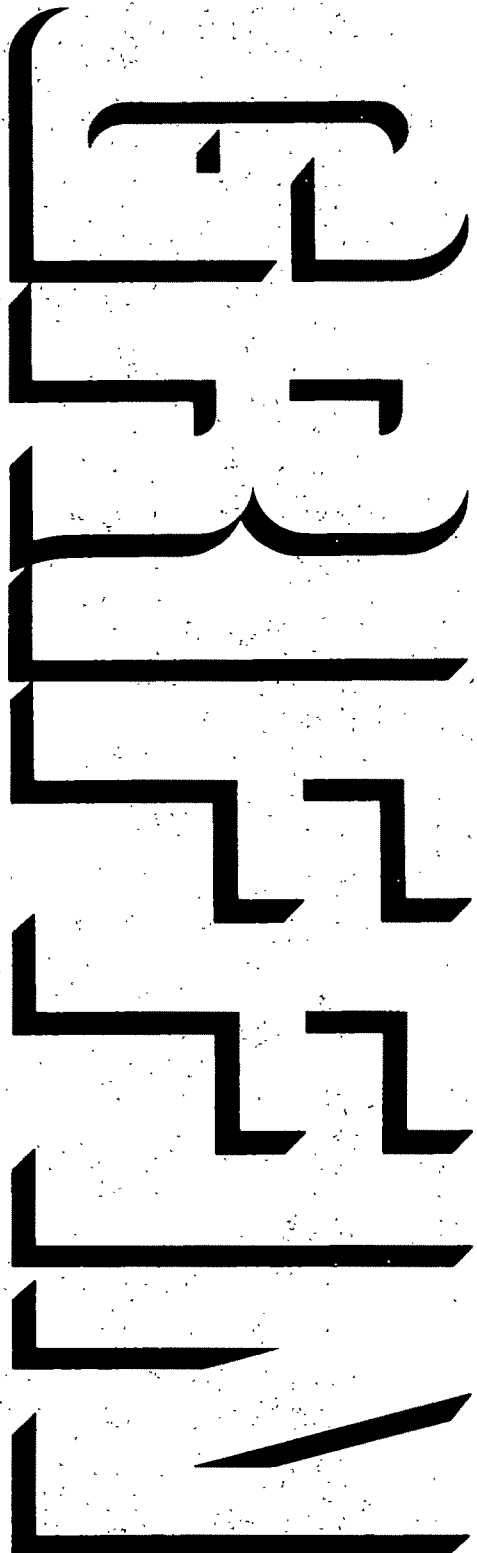
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1. *Journal of the American Medical Association*, 1997; 278: 1039-1044.

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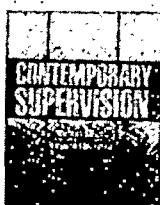


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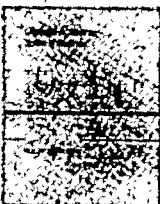
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